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N.Z. GEOMECHANICS NEWS

No. 29

NOVEMBER 1984

A NEWSLETTER OF THE N.Z. GEOMECHANICS SOCIETY

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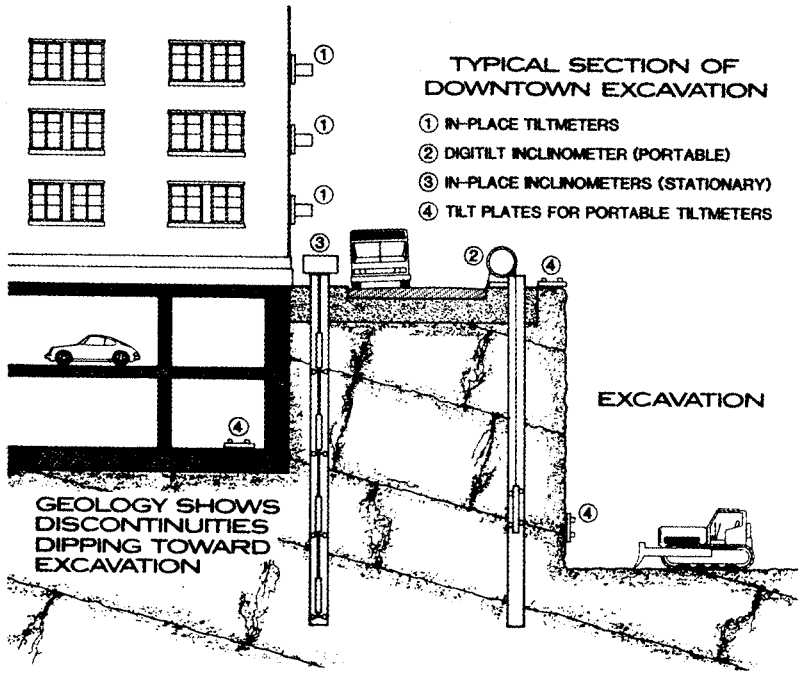

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NO. 29, NOVEMBER 1984

A NEWSLETTER OF THE N.Z. GEOMECHANICS SOCIETY

CONTENTS

THIS IS A RESTRICTED PUBLICATION

"N.Z. Geomechanics News" is a newsletter issued to members of the N.Z. Geomechanics Society. It is designed to keep members in touch with recent developments. Authors must be consulted before papers are cited in other publications.

Persons interested in applying for membership of the Society are invited to complete the application form at the back of this newsletter. The basic annual subscription rate is $20.00 and is supplemented according to which of the International Societies, namely Soil Mechanics ($10.00), Rock Mechanics ($13.00), or Engineering Geology ($6.00) the member wishes to be affiliated. Members of the Society are required to affiliate to at least one International Society.

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EDITOR'S NOTES

The Earthquake and War Damage (Land Cover) Regulations 1984 took effect earlier this year. This Regulation provides for the insurance of land against earthquake damage, disaster damage (damage caused by storm, flood, volcanic eruption or hydrothermal activity), and landslip damage, as well as the already existing cover to insured structures. The feature article in this issue is a review of the recently introduced Land Insurance Scheme, by Tony Mahoney. The article is published with the permission of the Earthquake and War Damage Commission.

In February this year, the Report of the IPENZ President's Task Committee on Professional Practice and Risk, "Engineering Risk", was released. The Report was initiated after recent, highly publicised failures of water retaining structures and is intended to educate members of the Profession of the uncertainties and risks associated with most types of engineering work. A summary chapter of the Report is reproduced in this issue. Copies of the Report are available from IPENZ at a cost of $5.00 to members and $8.00 to non-members, postage and packing extra.

The International Association of Engineering Geology is preparing a publication on the historical development of engineering geology. The book is to include a chapter on engineering geology in Australasia, and this is being prepared by David Bell of the Department of Geology, University of Canterbury. Members who are able to make a contribution are asked to send any information to David.

In 1978 the Department of Extension Studies of the University of Canterbury held a symposium on problems of slope stability affecting urban development on the Port Hills, Christchurch. The N.Z. Geomechanics Society has undertaken to bind the proceedings of the Port Hills Symposium and distribute a limited number of copies. Members wishing to obtain more information on the Port Hills Symposium should contact the Secretary.

The format, style and content of N.Z. Geomechanics News has remained largely unchanged in recent years. The Editor would be please to receive any comments from Members on the need and possible direction for any change.

Contributions to N.Z. Geomechanics News would be welcome. They may be in the form of technical articles, notes of general interest, letters to the Editor, or book reviews, and may cover any subject within the fields of Soil Mechanics, Rock Mechanics and Engineering Geology. Articles on site investigations, construction techniques or design methods which have been successfully used in New Zealand, and which would be of help to other members, would be particularly welcome. All contributions should be sent to the Editor.

G.G. GROCOTT
Editor

PUBLICATIONS OF THE SOCIETY

The following publications of the Society are available :

(a) From the Secretary, IPENZ, P.O. Box 12-241, Wellington North:

- Proceedings of the Palmerston North Symposium "Geomechanics in Urban Planning", April 1981. Price $25.00 to members.
- "Stability of House Sites and Foundations - Advice to Prospective House and Section Owners". (Published for the Earthquake and War Damage Commission). Price $0.50.
- Proceedings of the Third Australia-New Zealand Conference on Geomechanics, Wellington, May 1980. Price $45.00 for the three volume set.
- Proceedings of the Hamilton Symposium "Tunnelling in New Zealand", November 1977. Price $18.00 to members, $20.00 to non-members.
- Proceedings of the Second Australia-New Zealand Conference on Geomechanics, Brisbane, July 1975. Price $25.00.
- Proceedings of the Wanganui Symposium "Using Geomechanics in Foundation Engineering", September 1972. Price $8.00 to members, $10.00 to non-members.
- Copies of all back-issues of "New Zealand Geomechanics News" are available to members at a nominal price of $2.00 per copy.
- The following back issues of the IAEG Bulletin are available. Price $3.00 to members.

Issue	No Available
14	1
15	10
21	1

(b) From Government Bookshops:

- "Slope Stability in Urban Development" (DSIR Information Series No. 122). Price $2.00.

The following publications of the Society have been sold out:

- Proceedings of the Nelson Symposium "Stability of Slopes in Natural Ground", 1974.
- Proceedings of the Wellington Workshop "Lateral Earth Pressures and Retaining Wall Design", 1984.
- Proceedings of the Christchurch Symposium "New Zealand Practices in Site Investigations for Building Foundations", August 1969. The last copies of a limited reprinting are available at $8.00 to members, $10.00 to non-members.

P C McGREGOR
Publications Officer

A BRIEF REVIEW OF THE RECENT EARTHQUAKE AND WAR DAMAGE (LAND COVER) REGULATIONS 1984

by

A.G. Mahoney

On 21 June this year the Earthquake and War Damage (Land Cover) Regulations 1984 took effect. This Regulation has now resulted in an extension of cover to include land as well as the already existing cover to insured structures.

It appears that such land insurance is unique in the world.

This new scheme was born out of a recognition that many people have had severe financial losses resulting from the destruction of land whether or not such losses also included the insured structure. Following from the Abbotsford slip in 1979, there has been considerable discussion within the insurance industry in New Zealand as to extending insurance against loss of land.

At the same time as the Earthquake and War Damage Commission has extended its activities to include land insurance, its previous role in covering insured structures from storm and flood under its former Extraordinary Disaster Damage cover has now been relinquished. All flood and storm damage therefore will now be handled by the private insurance industry.

The new regulations provide for the insurance of land against earthquake damage, disaster damage (damage caused by storm, flood, volcanic eruption or hydrothermal activity), and landslip damage.

Where any building is insured against fire, the following property belonging to the owner of the building shall be insured under the regulations against earthquake damage, disaster damage, and landslip damage :

(a) The land on which the insured building is situated.

(b) All land within 8 metres, in a horizontal line, of the insured building.

(c) The land on which is situated the main access way to the insured building from the boundary of the land holding on which the insured building is situated.

(d) All water supply, drainage, and sewerage services, and structures appurtenant thereto, serving the insured building and situated within the land holding on which the insured building is situated.

(e) All bridges and culverts situated within any area specified in paragraphs (a) to (c) of this subclause.

(f) All retaining walls and their support systems within 60 metres, in a horizontal line, of the insured building.

A building is defined as any structure, whether permanent or temporary, which, if it were to be constructed or erected otherwise than by the Crown after the commencement of the regulations, would require the grant by a territorial authority of a building permit; but does not include :

(a) Any relocatable building in respect of which a permit has been granted under section 641 A(1) of the Local Government Act 1974.

(b) Any pole, tower, fence, wall.

The amount payable is not to exceed :

(a) The value, at the site of the destruction or damage, of :

i) An area of land equal to the minimum area allowable under the district scheme for land used for the same purpose that the destroyed or damaged land was being used at the time of the destruction or damage; or

ii) An area of land of 4000 square metres; or

iii) The area of land actually destroyed or damaged - whichever is the smallest; or

(b) If there is no district scheme operative in respect of the destroyed or damaged land, the value, at the site of the destruction or damage, of ii) and iii) above.

The regulations also contain provisions relating to :

- Excess
- Misdescription, misrepresentation, and concealment
- Reporting of claims
- Rights of salvage
- Forfeiture of insurance
- Subrogation of rights
- Mitigation
- Arbitration
- Cancellation of insurance
- Power of Commission to adjust value where a claim cannot be settled promptly
- Limitation of Commission's liability after settling a claim for partial loss.

The Regulations are expressly formulated with the intention of providing insurance on a reasonable minimum amount of land and including the necessary services and access to that area of the insured structure and its immediate surrounds. It is not the intention of the new scheme to insure against every small instability problem typically associated with residential areas, rather it is to provide a reasonable cover against the large event, i.e. loss of whole property, or substantial portion of that property and genuine loss and consequent hardship experienced.

At present the valuation of the area of land lost is being based upon current Government Valuation applicable to the area of the slip including debris. If any part of the slip is within 8 metres of the insured struc-

ture, then the full area of the slip (including that area beyond the 8 metres) is included in the claim.

The 8 metre zone of land out from the insured structure has been derived from a review of a wide range of Local Body yard requirements. The greatest minimum dimension required for yards in the typical residential setting was found to be 8 metres. Likewise, the length of 60 metres distance for retaining walls was arbitrarily based upon the average maximum length of driveways serving residential rear lots where there are specific limitations within the scheme.

For the purposes of this regulation, retaining wall is defined as a wall built to support earth at a higher level on one side of the wall than the other - but does not include :

(a) A wall built to retain water (i.e. tank, dam, swimming pool, etc.)

(b) A retaining wall built after commencement of these regulations if it did not conform to the lawful requirements of the appropriate territorial authority.

Hence within this definition, non permitted retaining walls (in excess of 1.2 metres height) built after 5 June 1984 will not have cover. Walls built prior to this with or without permits are covered.

While this latter situation may appear, particularly to soils engineers and the like, to be a wide open invitation by the Commission to be in the 'replacement of old retaining walls' business, the Commission has some further protection from unreasonable claims. The Commission (as also in the existing Landslip Damage Regulations 1956 Amendment No. 3) in determining whether any damage is earthquake or disaster damage or landslip damage, shall have regard to :

(a) Whether sound principles of site investigation and foundation design have been observed, and whether the construction of foundations and earthworks have been properly supervised.

(b) The standard of repair and maintenance of the insured property.

(c) Any neglect or carelessness of the insured person.

(d) Any other matter of any land, that the Commission considers relevant in the case.

In the case of item (d) particularly with respect to retaining walls, various engineering aspects could reasonably be taken into consideration when evaluating the loss. Some of these aspects may be the design and nature of the retaining system upon which the claim is being made, i.e. excessive height, reinforcing or lack of, provision for ground water control within the structure etc. One other area where some awareness may be appropriate on the part of the assessor, is the finite life of any structure and the varying life anticipation which is reasonable for different types of retention system, i.e. untreated timber wall as against a solid concrete gravity wall etc. As with any indemnity insurance, the age of the structure will need to be deducted from its anticipated life in order to assess the residual indemnity value of it.

In practice however, with the majority of cases, where retaining walls have failed (either partially or fully), compensation because it is based upon the value of the land area involved in the failure, will be considerably less than the replacement cost of the structure.

NEWS FROM THE MANAGEMENT SECRETARY

1. 1985 IPENZ CONFERENCE

The Conference is to be held in Wellington from 11 - 15 February, 1985. The Geomechanics Society will be sponsoring two sessions which will take place on Wednesday 13 February between 9.00 am and 12.00 noon.

Three papers will be given and their titles with brief summaries are given below :

a) Stability of Slopes in Closely Jointed Rock, by M J Pender.
The assessment of the stability of slopes in closely jointed rock is a major unsolved problem in civil engineering. The major difficulty is that of defining the properties of the rock mass. Back analysis of slopes and the application of non-linear strength envelopes are considered in the paper with particular reference to Wellington Greywacke slopes.

b) Some Geotechnical Aspects of the Lyttleton-Woolston LPG Pipeline, by N S Luxford and D H Bell.
The LPG pipeline traverses a variety of terrain from soft random reclamation fill through hard rock to soft marine sands before crossing the Port hills. This paper reviews the geotechnical and engineering geological aspects including tunnel support requirements and dynamic considerations for the marine pipeline crossing.

c) Marlborough Electric Power Board - Branch River Scheme Ground Anchors, by M C Jones.
Permanent ground anchors were used extensively on the intake structure of the Branch River hydro scheme. This paper describes the manufacture, installation, grouting and stressing of the bar anchors developed on the basis of FIP recommendations. Recommendations for future improvements to permanent ground anchors are made.

The fourth paper will be taken with the presentation and discussion of the "Draft Method of Soil and Rock Description" currently being prepared by a society subcommittee. Copies of the method will be circulated to those members at the session and later to all society members.

2. ANNUAL GENERAL MEETING

The Annual General Meeting of the Society will be held during the IPENZ Conference at 12.00 noon on 13 February, following the conclusion of the presentation of Society papers.

3. NOMINATIONS FOR 1985 MANAGEMENT COMMITTEE

Nominations for election of the Management Committee for 1984 were received on behalf of :

J R A Gammon	W J Henderson
D N Jennings	T J Kayes
N S Luxford	P J Millar
A J Olsen	B R Paterson
G Ramsay	S A L Read
Y Thorp	S J Woodward

Ballot papers have been circulated to members separately. The 8 members elected will be put to the Annual General Meeting of the Society on February 13 1985 for confirmation of election.

Two members of the 1984 and 1984 Management Committees, G G Grocott and P C McGregor are not standing for election in 1985. Both have contributed significantly to the operation of the Society, particularly in editing and publishing Geomechanics News for the part 2 years.

4. NEW MEMBERS

The following new members are welcomed to the Society :

W G Bartholomeusz	J B Chalmers
P D Egan	J R A Gammon
W J Gray	A J Heu
A M Lush	M W McLarin
M K Molineaux	S J Mouton
G T Proffit	M J D Stapledon

SAL READ
Management Secretary

FORTHCOMING CONFERENCES

11-14 February	1985	1985 IPENZ Conference, Wellington
11-14 February	1985	Geomechancis in Tropical, Lateritic and Saprolitic Soils, Brasilia, Brazil.
11-15 March	1985	4th International Symposium on Tunnelling. Brighton, United Kingdom.
24-28 June	1985	15th Congress of the ICOLD Lausanne, Switzerland.
26-28 June	1985	26th US Symposium on Rock Mechanics. Rapid City, USA.
June	1985	2nd International Conference on Soil Dynamics and Earthquake Engineering. Southhampton, United Kingdom.
06-08 August	1985	International Workshop on Dam Failures. West Lafayette, USA.
+11-15 August	1985	XI ICSMFE. ISSMFE Jubilee International Congress San Francisco, USA.
+02-04 September	1985	The Role of Rock Mechanics in Excavations for Mining and Civil Works. Mexico City, Mexico.
15-21 September	1985	First International Conference on Geomorphology. Manchester, England.
15-20 September	1985	Fundamentals of Rock Joints. Bjorkliden, Sweden.
+9-10 October	1985	International Symposium on Management of Hazardous Chemical Waste Sites. Winston-Salem, USA.
14-19 April	1986	Engineering Geology Problems in Seismic Areas. Bari, Italy.
20-26 October	1986	5th International Congress of the IAEG. Buenos Aires, Agentina.

+ Denotes ISSMFE, IAEG or ISRM Council/Executive Committee Meeting for 1985. It would be appreciated that members contemplating attending these conferences contact the Managemnt Secretary or Vice-Chairman of the appropriate discipline, so that New Zealand may be represented.

Further information on the conferences may be obtained by writing to the Management Secretary or the Vice-Chairman of the appropriate discipline.

SAL READ
Management Secretary

INTERNATIONAL SOCIETY OF SOIL MECHANICS AND FOUNDATION ENGINEERING

REQUEST FROM INTERNATIONAL TECHNICAL SUBCOMMITTEE

The Technical Subcommittee on Allowable Deformations of Buildings and Damages of the International Society of Soil Mechanics and Foundation of Engineering has requested the co-operation of the members of the New Zealand Geomechanics Society in establishing values of allowable distortions of buildings in order to recommend standards for buildings of different types of construction and on different subsoils.

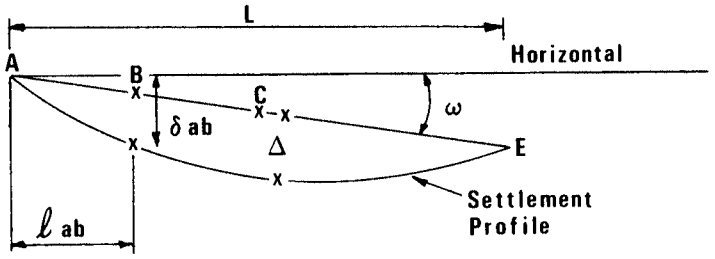
The objective of this International Subcommittee is to establish as accurately as possible the boundaries between allowable and unacceptable settlements for buildings of different types on different subsoils. Distortions are to be restricted to those occurring from static movements.

The International Subcommittee wishes to obtain reliable information on angular distortions of buildings and their relation to cracking and damage. Records of levels of buildings which have been obtained under a member's supervision are required. It would be helpful to obtain records where both good and bad performance has occurred.

The immediate objective of the International Subcommittee is to establish reliable "histograms of angular distortions vs cracks" (and other damage) due to settlement or heave.

Angular distortion is defined as differential settlement between a and b δ ab, divided by the span length ℓ ab, after subtracting the angle of tilt of the building ω .

Values of Δ (maximum relative deflection) divided by total length L are also useful.



$$(\text{Angular Distortion})_{ab} = \frac{\delta\ ab}{\ell\ ab} - \omega$$

Measurements of distortions near the allowable values shown in Table 1 and indicating the existence or non-existence of cracks and their widths would help to verify or modify the existing values.

TABLE 1 : Limiting Angular Distortion

Category of potential damage (1)	
Danger to machinery sensitive to settlement	1/750
Danger to frames with diagonals	1/600
Safe limit for no cracking of buildings*	1/500
First cracking of panel walls	1/300
Difficulties with overhead cranes	1/300
Tilting of high rigid buildings becomes visible	1/250
Considerable cracking of panel and brick walls	1/150
Danger of structural damage to general buildings	1/150
Safe limit for flexible brick walls, L/H >4*	1/150

(1) From Bjerruin
* Safe limits include a factor of safety

Data submitted should indicate prime use of the building e.g. Office, Residential, Industrial Plant etc. : type of frame; concrete, steel etc.; or brick or concrete walls and the foundation subsoil e.g. clay, sand etc. Recognition to the contributor will be given in the International Report.

Please send any relevant information to :

Vice Chairman Soil Mechanics and Foundation Engineering
New Zealand Geomechanics Society
P.O. Box 12241
Wellington North
New Zealand

No later than January 31st 1985.

This will then be forwarded on to the International Subcommittee.

"ENGINEERING RISK"

INSTITUTION OF PROFESSIONAL ENGINEERS, NEW ZEALAND

REPORT OF THE

PRESIDENT'S TASK COMMITTEE ON

PROFESSIONAL PRACTICE AND RISK, 1983

SUMMARY

CHANGING SOCIAL STRUCTURE

Particularly over the past quarter centary, changes in social structure and values have affected the environment within which our profession practises. Improvements in communication systems, rising human expectations, and changes in the priorities of sections of the community, have placed the engineer most at risk in various ways. We are more likely to find our work criticised in public or be held responsible for any later lack of satisfaction by those who have sought our advice. We are finding that our services are often sought not for professional advice but to provide a performance guarantee. As a profession, we should not align ourselves with any one segment of our society, but should endeavour to impart our knowledge and advice in an impartial manner.

RISK ASSESSMENT - THE STATE OF THE ART

Risk assessment is a comparatively new technology. It is an essential tool for use in any consideration of new or hazardous projects or processes. The state of the art is such that it is difficult to allow for some factors such as human unreliability. Engineering judgement will continue to play a major role.

Laymen generally assume that engineers are practising a science which uses exact figures and design methods; we need to communicate the uncertainties and risks in our art to decision makers and the public so that they can better judge the reliability of our advice. The cost-benefit studies used in evaluating benefits and losses should be supplemented with opportunity-cost studies. All assessments should include an evaluation of low probability hazards as well as advice on the social costs of an overcautious attitude to new technology.

RESPONSIBILITIES

Our profession accept certain responsibilities if it wishes to play a leading role in human progress. Our predecessors fulfilled this obligation in their major contribution to the improvement in the quality of life initiated by the Industrial Revolution. The law places on the modern engineer an increasing duty of care towards those who rely on his or her advice and skill. This duty extends to local authorities and government agencies so that almost every member of our profession is at risk that he may make an error which will cost him or his employer heavy damages. The view is

expressed that some limits need to be placed on these risks. Continuation of present trends will discourage innovation or advances in our technology. Our profession is partly to blame for these changed social attitudes as we have led people to believe that we are involved in an exact science when in fact we are practising an art. We must convey to the devision makers information on the uncertainties in our designs or advice so that they are able to make decisions and take responsibility for the success or failure of a project.

CONTROLLING RISKS

Risk management is intended to control the level of risk and to mitigate their effects. Members of our profession can reduce the risks they face by practising skilfully and by exchanging information that may reduce future losses. Liaison between the designers and construction supevisors of engineering works is essential. Members of the profession should give thought to professional indemnity insurance protection. Employers and clients are best protected if they employ skilled professional staff or consultants. Local authorities need to give thought to the degree to which they become involved in the affairs of their citizens as this affects the level of their risks. There is a tendency for organisations to attempt to transfer their risks to others and to engineers in particular. Our profession has no duty to underwrite the commercial risks of entrepreneurs. The public are protected against many risks but in some cases this is done in an inefficient manner. Risks are best controlled and their effects mitigated by co-operative action on the part of all sections of our society. We must assist our employers or clients to arrange insurances or make other provisions that will minimise or mitigate risks and that will ensure the co-operation of all parties, without the need for litigation, when the disaster occurs.

Every engineering design should receive an independent check before it is approved for construction. The operation and maintenance of existing works should be reviewed at suitable intervals. For major projects it may be advantageous to formalise the system whereby engineering work is checked by the appointment of a Review Panel.

COMMUNICATE, COMMUNICATE, COMMUNICATE

Our profession needs to appreciate the problems and responsibilities of the news media and should co-operate with them. There is evidence that the media are less able to control public opinion than is generally thought. More attention needs to be given to the standard and form of our reports and other methods of communicating our knowledge and advice on probable risks, benefits and costs. There is considerable room for improvement in communications between entrepreneur and those responsible for the orderly planning for the overall objectives of the community.

INSURANCE

Insurance spreads risks and releases capital by exchanging a regular payment (a premium) for the risk of an unpredictable catastrophic loss. Insurance does not of itself remove hazards. Our profession needs a better appreciation of the purpose and scope of various types of insurance and it should be more ready to seek professional advice on this matter. Only a small proportion of premiums paid for liability insurance is used to correct errors; a high proportion is spent establishing liability. This is a trend which should be avoided by suitable co-operation with insurers.

WHAT IS AN ACCEPTABLE RISK?

We cannot produce a risk free society. People accept various levels of risk associated with their pastimes and activities. As a result of considerable research, it is now possible, in some areas, to predict human attitudes to risks. Generally it is found that society will accept a higher level of risk where those risks are assumed voluntarily than where those risks are imposed on them by others. Decisions made by authorities on levels of risk are often influenced by the alternatives available. They seldom meet with universal approval.

PROFESSIONAL IMPLICATIONS

Members of our profession often find themselves in a situation where there is a conflict of interest which may inhibit the dissemination of knowledge of risks and hazards. The current methods of resolving differences of opinion regarding technological matters are often inefficient. There is much to commend the public involvement in various types of technical tribunals but our profession must endeavour to ensure that the tribunals are always provided with complete and impartial technical advice.

PRESIDENT'S TASK COMMITTEE

C M Strachan: (Chairman): Fellow, Past Executive Vice President. Consulting Engineer (C M Strahan & Associates). Chairman, Standards Association of New Zealand.

K W Cory-Wright: Member, Honorary Secretary-Treasurer Elect. Managing Director, Engineering, Cory-Wright & Salmon Ltd.

D A Ferrier: Fellow, Past Executive Vice President. Borough Engineer, Kapiti Borough Council.

R G Norman: Fellow, Past President. Commissioner of Works, Ministry of Works & Development.

R D Northey: Scientist. Australasian Vice President, International Society for Soil Mechanics and Foundation Engineering. Deputy Director, Soil Bureau, DSIR.

Secretariate :

K J Haywood: Chartered Accountant, Calvert Haywood & Company.

K S Odlin: Fellow. Consulting Engineer (Odlin Sowry & Company). Director, Indemnity & General Insurance Co. Ltd.

Professional Advisers :

D F Adam: Insurance Consultant & Broker, Adam & Adam Ltd.

A D MacKenzie: Barrister & Solicitor, Rudd, Watts & Sonte.

LOCAL GROUP ACTIVITIES

1. Geomechanics Lecture

Professor P.W. Taylor, Head of Civil Engineering at the University of Auckland and formerly Australasian Vice-President of ISSMFE, delivered the Fourth Geomechanics Lecture to local group audiences in Auckland, Wellington, Christchurch and Dunedin in September and October. The lecture was titled "Geotechnical Engineering : Education and Practice in New Zealand". The Geomechanics Lecture is the prestigious lecture of the Society : on this occasion the Society was proud to honour the major contribution made by Professor Taylor to geomechanics practice in New Zealand during the past 30 years. The meetings were held jointly with the local IPENZ Branch in each centre.

2. Wellington Group

On October 25, a combined meeting was held with the Wellington Branch of IPENZ. The speakers were Kelvin Berryman and Alan Hull of Earth Deformation Section, NZ Geological Survey. The topic of their presentation was "Earth Deformation in New Zealand". Alan Hull provided an introduction and reviewed the Tectonic setting of New Zealand. He showed where active earth deformation has taken place in recent times, as displacement along faults, and as folding and uplift in the east coast north island area. Some of the evidence for deducing deformation rates was presented. Kelvin Berryman followed with a discussion of results from detailed investigations of recent faulting along the Mohaka Fault in Hawkes Bay, and the Cardrona Fault in Central Otago. The presence of active faults in an area implies past large magnitude earthquakes, and by careful observation of displacements caused by these earthquakes, it is possible to infer their magnitude, and given suitable stratigraphic markers, such events can be dated. Kelvin discussed the methodology used for such studies and showed examples of the detailed logs that have been compiled from trenches across recent traces of these two faults.

I M BROWN

3. Christchurch Group

On Thursday 12 July 1984 an early evening meeting was held at the University on the "Design and Construction of the Lyttelton-Woolston LPG Pipeline". Speakers were Mr Alan Orange (the project engineer), Mr Paddy Luxford (a geotechnical engineer involved with design) and Mr D H Bell (engineering geology consultant to the project). Mr R W Morris, a local consulting engineer whose firm was closely involved with route selection for the pipeline, chaired the meeting. Approximately 35 people attended, and a lively discussion followed completion of the speakers' presentations, to which Mr Orange's excellent contribution was particularly important and noteworthy.

The Christchurch Group administration (Mr B R Paterson, NZ Geological Survey; Dr J R Pettinga and D H Bell, University of Canterbury) remains concerned at the lack of interest shown in both the Society and its local activities by members of the profession. Very few practising engineers in Christchurch are members of the New Zealand Geomechanics Society, and were it not for the support received from the University of Canterbury staff and students, it is very doubtful if the local group would remain viable. We certainly look forward to discussing this matter further with the Canterbury Branch of IPENZ, with a view to both a long-term increase in Society membership, and more importantly to a marked improvement in local professional interest and support: there are certainly matters of geomechanics interest and concern within the wider area of Canterbury, if not within Christchurch City itself.

D H BELL

INTERNATIONAL TUNNELLING ASSOCIATION

TENTH ANNUAL MEETING - CARACAS 1984

PRESS RELEASE

The International Tunnelling Association held its tenth annual meeting in Caracas from the 4th to the 7th of June 1984 in conjunction with the I Latin American Congress of Underground Construction: Underground Construction and Heterogeneous Soils. The meeting was attended by representatives/delegates, observers, and working group members of 20 of the 34 member nations of the Association and 1 representative of an International Association.

MEMBER NATIONS REPERSENTED

South Africa, Federal Republic of Germany, Belgium, Canada, People's Republic of China, Egypt, Spain, United States of America, Finland, France, Iceland, Italy, Japan, Mexico, Netherlands, Norway, United Kingdom, Sweden, Czechoslovakia, and Venezuela.

MEMBER NATIONS NOT REPRESENTED

Algeria, Australia, Austria, Brazil, Columbia, Republic of Korea, Denmark, Greece, Hungary, India, Irak, New Zealand, Poland, Switzerland, and Turkey.

ORGANIZATION

The Association has registered two new member nations: Denmark and Egypt, and one exclusion: Greece. The new category of members "affiliates" permitted the adhesion of 14 corporate members and 10 individual, which reached a total of 42 members (27 corporate members and 15 individual members).

The Executive Council is unchanged :

J.K. LEMLEY	USA	President	until 1986
G. GIRNAU	FRG	Past President	until 1989
H.C. FISCHER	Sweden	Past President	until 1986
A.M. MUIR WOOD	United Kingdom	Honorary President	
E. BROCH	Norway	Vice-President	until 1986
H.P.S. VAN LOHUIZEN	Netherlands	Vice President	until 1986
E. TEGUIDO NOGUES	Spain		until 1987
Y. ONOUCHI	Japan		until 1987
GAO QUQING	P.R. China		until 1985
Z. GERGOWICZ	Poland		until 1985
V. ROISIN	Belgium	Secretary General	

WORKING GROUPS

Nine of the ten working groups previously created held working sessions during this Conference.

Working Group Research/ J.F. Bougard - France

The meeting gathered 14 persons (including two observers from Mexico) representing 9 countries.

The general procedure that all studies should follow has first been precised and approved.

Then the situation of current activities has been examined :

- The study related to water problems in tunnelling is nearly achieved and will probably be issued by next meeting.

- The study concerning the use of TBM in hard and abasive rock will be resumed.

- For the extruded tunnel lining, data have been gathered and an intermediary report will be made next year.

Finally, it has been decided to start studies about :

- settlements occurring when tunnels are built,

- slurry and earth pressure balanced shields and to update the status quo and future priorities in tunnelling research led by adherent nations.

Working Group Contractual Sharing of Risks/ Salter - USA

Six nations were represented at the working group session: Belgium, Italy, Japan, Norway, South Africa and the United States.

The Group reviewed work in progress, including development of contracting guidelines on "MEASUREMENT PROBLEMS" and "THE ROLE OF THE ENGINEER". Also, it reviewed the status of drafting a new Part IV of the "CONDITIONS OF CONTRACT (INTERNATIONAL) FOR WORKS OF CIVIL ENGINEERING CONSTRUCTION" of F.I.D.I.C. New topics assigned for development of discussion papers were : "PROTECTION OF ADJACENT STRUCTURES", "EXTRAORDINARY WATER PROBLEMS", "RIGHTS-OF-WAY AND PERMITS", "OWNER-FURNISHED MATERIALS, PLANT AND EQUIPMENT", and "ALTERNATIVE TENDERS".

Working Group Subsurface Planning/ Michael B. Barker - USA

The Working Group on Subsurface Planning continues its work to exchange and document case studies where the effective use of the subsurface has improved urban life. The Group heard five presentations covering the subjects of geothermal neighborhood heating, energy production and storage, energy conservation through earth-sheltered buildings, and underground food storage.

Representatives from eight countries discussed the presentations. The presentations were heavily illustrated. The city of Caracas was discussed as

a valley city where underground installations in the surrounding valley walls presented opportunities to consolidate utilities, save urban surface space, and enhance the city environment.

Working Group Catalog of Tunnels/ G. Fukuchi - Japan

The meeting of the Working Group was held with five participants from four countries. During a period after the precedent meeting in Warsaw, eleven (11) countries including one Latin American country submitted a catalogue of tunnels. The Working Group adopted a proposal to quote relevant reports in the catalogue, so as to enhance the usefulness of the catalogue.

Working Group Maintenance and Repair of Underground Structures/ A.J. Howard - United Kingdom

The Group gathered nine people representing five nations. There was a fruitful discussion of a wide range of topics connected with tunnel maintenance and repair. It was decided to study non-destructive methods of finding and identifying defects in tunnel linings during the coming year; and to prepare a note for early publication concerning storage of tunnel construction methods.

Working Group General Approaches to the Design of Tunnels/ H. Duddeck - FRG

In continuation of the meeting in 1983 the Working Group discussed the main steps for a consistent design procedure of tunnels: geotechnical parameters, the role of an analytical model, in-situ monitoring, design rules derived by experiences. Contributions from Switzerland, Japan and Italy have been presented. A first draft of recommendations will be written by five European members for an intermediate meeting in Cambridge, U.K. September 1984.

Working Group Seismic Effects on Underground Structures/ W.W. Hakala - USA

The original objectives of the Working Group essentially have been accomplished. The state-of-the-art in the participating countries has been assessed and documented. Excellent dialogues have been developed among the member nations. An aseismic design monograph for underground facilities is presently being completed. Upon publication, the formal activities of the Working Group will be terminated.

Working Group Health and Safety in Work/ N. Krige - South Africa

The group gathered ten (10) persons representing seven (7) member nations. The group discussed three chapters of the "Guidelines for Good Tunnelling Practices": work in compressed air, electrical installation, and use of compressed air. Publication is expected in 1985. Other topics will be included in the Guidelines: communication, use of TBM's and roadheaders, and water problems. Final draft of six (6) new signs were discussed.

Working Group Cost/Benefits of Underground Urban Public Transportation/ M. Blenneman - FRG

In the session of this group twelve (12) delegates from nine (9) countries discussed a report on "Examples for Benefits of Underground Urban Public Transportation Systems". This report is a worldwide collection of data regarding the effects and benefits of using the subsurface for an urban railway system. Furthermore, methods of cost-benefit calculations were discussed. The group will prepare papers in this field from several countries up to the next meeting in 1985.

OPEN SESSION - PROTECTION OF UNDERGROUND STRUCTURES AGAINST SEISMIC EFFECTS

The open session on Wednesday, June 6, featured the topic "Protection of Underground Structures Against Seismic Effects". The session was chaired by the I.T.A. President, J. Lemley. H.P.S. Van Lohuizen, Vice-president (Netherlands) provided the opening address, while W.W. Hakala (U.S.A.) served as the rapporteur for the session. S. Baggeti (Venezuela) acted as the Secretary. Papers were presented by G. Fukuchi (Japan), B.E. Vretblad (Sweden), N. Barton (Norway), C. Dowding (U.S.A.), N. Krige (South Africa), and C. St.John (U.S.A.). These papers represented a wide range of problems related to dynamic effects on underground facilities.

The main results of the activity of the Working Groups, the report of the open session, the main decisions of the General Assembly, will be published in the I.T.A. Journal "Advances in Tunnelling Technology and Subsurface Use" published by PERGAMON PRESS.

The next annual meeting will be held in Prague (Czechoslovakia) in September 1985 in conjunction with International Conference on "Underground Structure in Urban Areas" organized by the national Czechoslovak group of I.T.A.

I.T.A. member nations are requested to encourage their members to submit papers to be presented during the Congress.

ACTIVITIES OF THE AUSTRALIAN GEOMECHANICS SOCIETY FOR 1983-4

In Australia the Australian Geomechanics Society is the National Group representing the IAEG, the ISRM and ISSMFE.

The State groups of the Australian Geomechanics Society have organized over 40 Technical meetings and Symposia in the last year. These covered a wide range of topics including piling, instrumentation, grouting, mining and foundations. The most common these this year was in environmental matters, with topics such as disposal of radioactive waste from mining and milling of radioactive ores, controlling pollution flumes from hazardous wastes and

landfills, designing for mining subsidence, and predictions of subsidence due to groundwater withdrawal. Two other topics were an extension course on in-situ testing and a symposium on latent soil conditions and earthworks specifications.

The main activity in the 1984 calendar for the Australian Geomechanics Society was the 4th Australia-New Zealand Geomechanics Conference held in Perth in May 1984. The theme of the Conference was "Geomechanics - Interaction".

W M REGAN

FROM THE INTERNATIONAL VICE-CHAIRMEN

1. Soil Mechanics

1.1 The following papers were submitted on behalf of our Society to the XI International Conference on Soil Mechanics and Foundation Engineering to be held in San Fransisco in 1985.

- Cracking and critical state concepts for soft rock. I.W. Johnston and E.A. Novelo.
- Excessive failures - a probabilistic approach. R.N. Chowdry.
- An effective stress slope stability method for dams. G.S.N. Adikari and P.J. Cummins.
- Effects of repeated loading on earth pressures. P.J. Moore and C.H. Chin.
- Assessment of the stability of jointed rock slopes. J.P. Ashby.
- Aspects of landslide mobility. G. Salt.
- A material characterisation of lateritised pollide zone soils. D.M. Smith.

Any person wishing to receive further information on these papers should contact the Secretary.

2. Engineering Geology

2.1 IAEG Bulletin

In recent years the low subscription for the IAEG Bulletin has been insufficient to meet the cost of publication and distribution, particularly with the increasing size of the volumes. At the Moscow meeting in August the IAEG Executive Committee decided to accept advertisements from interested organisations for insertion in Bulletin No. 31 (June 1985) and later volumes. As the Bulletin reaches 4000 members in 69 countries this would be an efficient medium for widely publicizing a product or service. For further details please contact the Engineering Geology Vice Chairman or the Management Secretary.

2.2 Symposium on "Engineering for Dams and Canals":

The proceedings are shortly to be published, incorporating both the edited papers and the discussion sessions. Papers in this Volume of particular engineering geology interest include:

Presentation of Geological Data. BELL, DH; PETTINGA, JR

PATERSON, BR; HANCOX, GT; THOMSON, R; THOMPSON, BN
Investigations in Hard Rock Terrain

HEGAN, BD; MILLAR, PJ "Investigations in Soft Rock Terrain"

PREBBLE, WM "Investigations in an Active Volcanic Terrain"

MANSERGH, GD "Investigations in Unconsolidated Deposits"

OBORN, LE "Identification and Evaluation of Geotechnical Hazards"

Copies of this publication may be obtained at a cost of NZ$50 from the Publications Officer, New Zealand Geomechanics Society, c/- IPENZ, PO Box 12-241, Wellington, New Zealand.

1984 IPENZ CONFERENCE, HASTINGS

Editors Note :

The 1984 IPENZ Conference was held in Hastings in February of this year, having the theme engineering and primary production.

Two papers were given by members of the NZ Geomechanics Society. The Abstract and Introduction of the papers are reproduced here. Members wishing to obtain a copy of any of the papers should request this through the Secretary.

1. HAWKES BAY LANDSLIDES AND THEIR INFLUENCE ON PRIMARY PRODUCTION

by

Jarg R Pettinga
University of Canterbury
Christchurch

and

David H Bell
University of Canterbury
Christchurch

ABSTRACT

Consolidated but uncemented weak mudstones and sandstones of Cretaceous and Tertiary age outcrop extensively in the East Coast (North Island) region, and this "soft rock terrain" is both geologically complex and tectonically very active. Areally extensive (1-100+ ha) deep- and shallow-seated landslides are widespread in occurrence, and involve both bedrock failures and the movemnt of surficial materials. Regional uplift during Late Quaternary times has resulted in episodic stream incision, giving rise to two distinctive landscape types, 1) an inactive or **relict terrain**, and 2) an active or **rejuvenated terrain.**

Identification of terrain type is essential to sound farm management because traditional grassland methods are often unsuited to the rejuvenated areas: in addition, actively rejuvenating terrain provides the principal source of stream sediment load and consequent downstream flood aggradation. To increase farm yields and to reduce erosion in such areas, comprehensive protection or remedial measures need to be implemented, and these in turn must be based on a realistic assessment of the site geology and geomorphology. We outline an **engineering geological approach** to farm management that identifies geotechnical constraints to development, and we suggest that such an objective can best be met by the employment of a suitably qualified **engineering geologist** as part of local catchment authority "specialist teams".

2. SOME CIVIL ENGINEERING CONCEPTS RELEVANT TO SOIL EROSION PROCESSES

by

J G Hawley
Soil Conversation Centre Aokautere
MWD, Palmerston North

INTRODUCTION

My aim in this paper is to show that many concepts developed for civil engineering purposes are being applied within the context of preserving the agricultural, i.e., primary, productivity of our land.

Civil engineers almost invariably use the word 'erosion' to refer to incremental loss or attrition, and in doing so have the support of the editors of most dictionaries. Soil conservators however use the work 'erosion' to include not only surface attrition but mass movement (e.g., landslides) and loss of soil components to percolating groundwater.

Most of the countries surrounding the Mediterranean Sea were changed from "Garden of Eden" to deserts as the result of erosion accelerated by agricultural uses of the land (Ref 1). In most of these countries the change was spread over about a thousand years - just too slow a process for any one generation to comprehend. The great irrigation works of antiquity were not built to convert areas which were natural deserts to productivity, they were built in a frantic effort to preserve productivity on land which had lost both its fertility and its water storage capacity as a result of losing its humic layer and its fine particles (clay fraction) by erosion. They were built by civilisations in decline rather than by civilisations heading towards greater prosperity.

Our land here in New Zealand has been farmed for only one hundred and forty years - some of it for much less. Can we be sure that we are not on course to lose our soils as fast as the ancients lost theirs? To be sure that we have not had one hundred of our thousand years we would have to be sure that erosion had not already caused potential productivity to decline by 10%. Reference will be made below to recent studies which have shown that the potential productivity of a large area of our pastoral hill country has already decreased by 18% as a result of accelerated erosion.

Modern technology (e.g., aerial topdressing, and sowing improved pasture species) has masked the effects of erosion by giving us increased productivity in most areas. However, because these inputs cost money and because greater inputs are needed every decade to compensate for the effects of erosion, profitability must suffer sooner or later : in some places it has already.

APPLICATION FOR MEMBERSHIP

OF

New Zealand Geomechanics Society
A TECHNICAL GROUP OF THE NEW ZEALAND INSTITUTION OF PROFESSIONAL ENGINEERS NEW ZEALAND

The Secretary,
Institution of Professional Engineers N.Z.,
P.O. Box 12-241,
WELLINGTON.

I believe myself to be a proper person to be a member of the N.Z. Geomechanics Society and do hereby promise that, in the event of my admission, I will be governed by the Rules of the Society for the time being in force or as they may hereinafter be amended and that I will promote the objects of the Society as far as may be in my power.

I hereby apply for membership of the New Zealand Geomechanics Society and supply the following details :

NAME _____
(To be set out in full in block letters, surname last).
PERMANENT ADDRESS _____

QUALIFICATIONS AND EXPERIENCE _____

NAME OF PRESENT EMPLOYER _____
NATURE OF DUTIES _____

Affiliation to International Societies: (All members are required to be affiliated to at least one Society, and applicants are to indicate below the Society(ies) to which they wish to affiliate).

I wish to affiliate to:

International Society For Soil Mechanics and Foundation Engineering	(ISSMFE)	Yes/No	($10.00)
International Society for Rock Mechanics	(ISRM)	Yes/No	($13.00)
International Association of Engineering Geology	(IAEG)	Yes/No	($ 6.00)
			$16.00 with Bulletin)

Signature of Applicant _____
Date _____ 19____

N.B.: Affiliation fees are in addition to the basic Geomechanics Society membership fee of $20.00. Please do not send fees with this application. An account will be rendered on your acceptance into the Society.

Nomination:

I _____ being a financial member of the N.Z. Geomechanics Society hereby nominate _____ for membership of the above Society.

Signed _____ Date _____ 19____

NEW ZEALAND GEOMECHANICS SOCIETY

NOTIFICATION OF CHANGE OF ADDRESS

The Secretary,
The Institution of Professional Engineers New Zealand,
P.O. Box 12241,
WELLINGTON.

Dear Sir,

CHANGE OF ADDRESS

Could you please record my address for all New Zealand Geomechanics Society correspondence as follows :

_____

_____

_____

Name: _____

Address to which present correspondence is being sent:

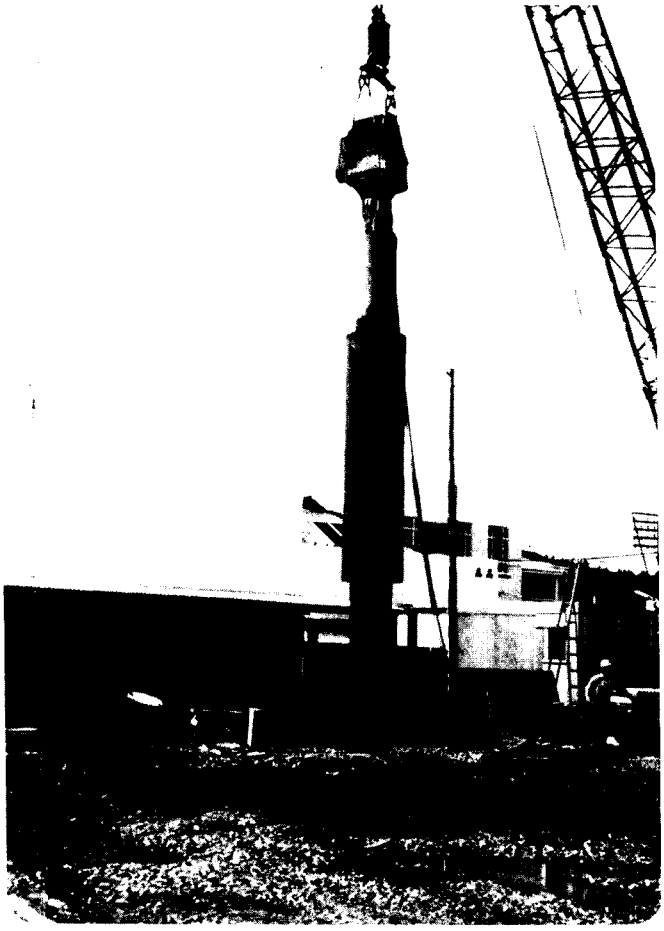
_____

_____

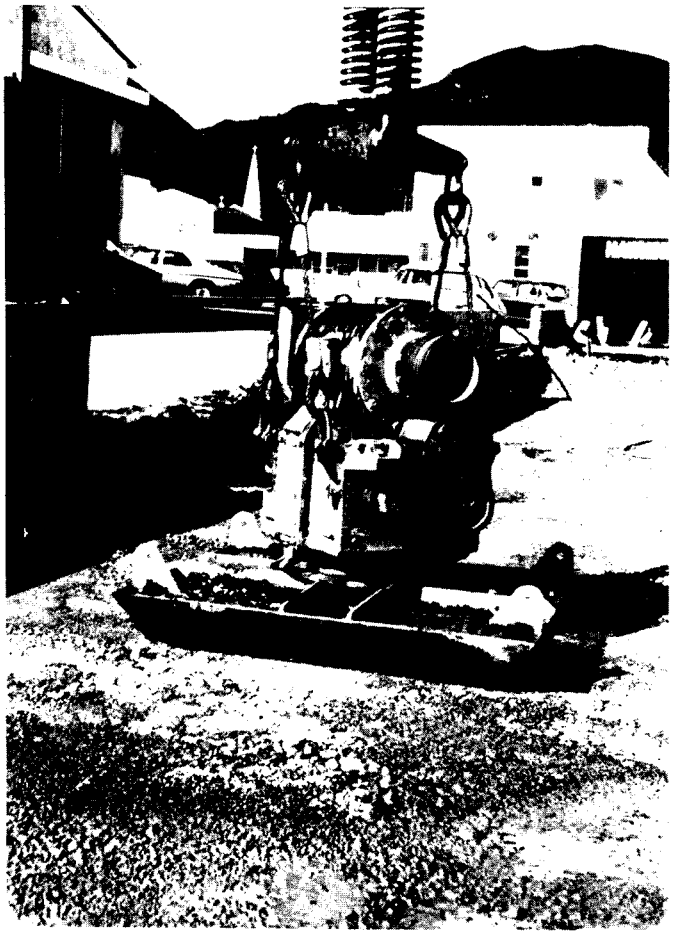
_____

Signature _____

Date _____



Deep Compaction of Loose Sands – Thames Using – Gilberd Hadfield Patented Vibro Probe (Effective Depth: 7 to 8 metres)



Surface Compaction Vibro United Bolted to Steel Tray (Effective Depth: 1.5000 metres)

GROUND STABILISATION

Open Trench – Showing Stabilised Sands Resulting from use of above methods.

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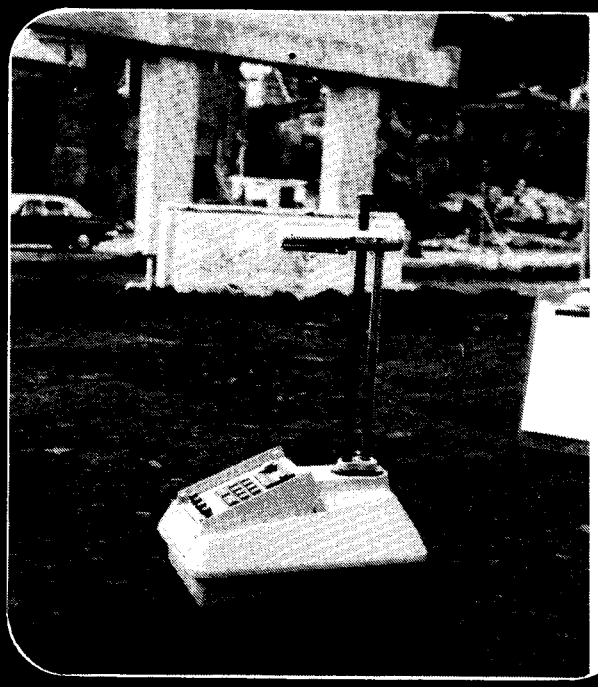

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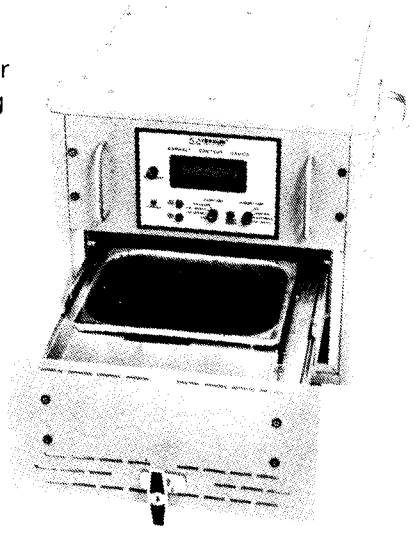

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