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International Conference on Case Histories in
Geotechnical Engineering

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Welcoming Remarks

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WELCOME AND OPENING REMARKS

Shamsher Prakash
Conference Chairman
Professor of Civil Engineering
University of Missouri-Rolla

It is my great pleasure to welcome you to this historic city of St. Louis, Missouri, to no less a historic event, the First International Conference on Case Histories in Geotechnical Engineering.

To begin planning the program, approximately 500 letters were mailed to professional colleagues in the United States, Canada, Australia, India, New Zealand, Mexico, and Europe indicating our intention to host this conference. The proposed themes were listed and comments were solicited. We were encouraged when we received 98 positive responses, with prospects of papers from 28 countries.

The call for papers was issued in August 1982 and papers were contributed from 38 countries, making this conference a truly international one. The large number of papers received were reviewed by a panel of international experts.

It may not be out of place to mention that two previous conferences were devoted to Case Histories on a much different scale.

1. Performance of Earth and Earth Supported Structures - Purdue University, 1972, 4 days

2. Specialty Session on Case Histories at the IX International Conference on Soil Mechanics and Foundation Engineering, Tokyo, 1977, 1 day

We received an overwhelming response from all over the world and participants from 31 countries and 205 papers do make an impressive record.

In planning this event we needed financial and moral support. It has been organized in cooperation with the International Society for Soil Mechanics and Foundation Engineering; Central Building Research Institute, Roorkee; University of Roorkee; Asian Institute of Technology, Bangkok; Chinese Academy of Building Research; and the Institute of Rock and Soil Mechanics, Academia Sinica, Wuhan. This is enough of moral support. National Science Foundation has co-sponsored and partially funded the conference. We are extremely grateful to all of them.

The delegates have travelled long distances at some discomfort to them to participate in this conference. There are many places to relax around here after the conference meetings in the evening. I strongly recommend you explore some of those places on your own.

The weatherman has assured us that we should look forward to beautiful spring weather during the week and I believe you will take home sweet memories of this city and the conference with you.

I would like to take this opportunity to thank the authors who contributed to this conference, the members of the organizing committee who guided me in steering this conference, and my colleagues at UMR, who came to my help whenever I needed it. I am extremely thankful to Joseph H. Senne, Chairman, Department of Civil Engineering, and John T. Park, Vice Chancellor for Academic Affairs, UMR, who consented to be with us this morning and welcome the participants.

WELCOMING REMARKS

John T. Park
Vice Chancellor for Academic Affairs
University of Missouri-Rolla

I am pleased to welcome this gathering of international experts on geotechnical engineering. The University of Missouri-Rolla is pleased to serve as the host to the International Conference on Case Histories in Geotechnical Engineering.

The list of participants and contributors is indeed impressive. Thirty-one countries are represented by over two hundred participants. The world's leading experts in geotechnical engineering will present numerous case histories for discussion by this august group.

I have read through the proposed program and wish to compliment the organizing committee and its chairman, Professor Shamsher Prakash, on their work. While I am not knowledgeable in matters of geotechnical engineering, I share the layman's interest in the phenomena. The concept of discussing real case histories of the response of various structures and soils under actual earthquake stress is intriguing. The discussion of actual histories by this internationally renowned group of experts cannot help but provide new insights.

It has been over a hundred and seventy years since St. Louis has had an earthquake of major proportion. I hope that it will be a long time before Missouri can provide a case history of the magnitude of the 1812 earthquake on the New Madrid fault. This International Conference on Case Histories in Geotechnical Engineering will assist in providing information on the performance of various structures and soils during such an earthquake. The shared information together with a knowledge of the local structures and soils will provide the basis for predicting the results of local earthquakes without doing the experiments.

I wish you the best in your endeavors and invite you to return to Missouri. You are cordially invited to visit the University of Missouri--Rolla. I know that this conference will meet your highest expectations for you both professionally and socially.

WELCOMING REMARKS

Joseph H. Senne
Chairman, Civil Engineering Department
University of Missouri-Rolla

Now that you have been welcomed by UMR, I would like to welcome you on behalf of our Civil Engineering Department. Our present enrollment in civil engineering is 544 students of which fifty are working towards a masters degree and nineteen are Ph.D. candidates. Four of these Ph.D. candidates are in the geotechnical area.

Since my interests are in structures, I can appreciate some of the problems that face the geotechnical engineer, particularly those engaged in foundation design. Structural engineers have had their share of failures even though their designs are based on relatively exact analysis. Consider then the foundation engineer who deals with a material containing a wide variety of properties in which experience and judgement probably play the prominent role in design.

In looking over the papers to be presented at this conference, I note that a large number of case histories deal directly with failures of some type. I think this points to the fact that this is a concern and that through this mechanism of communication we should be able to improve the design process. One of the items that I usually mention when giving a welcome to our geotechnical short courses such as the ones on deep and shallow foundations is that our purpose is to help you maintain a low profile. The news media seems to prefer sensational topics and the general public doesn't really hear much about the difficult work that a foundation engineer does until there is a dam or building foundation failure. So perhaps this conference will help maintain your anonymity by limiting such occurrences.

Again, we do welcome you, and if you have the time, I hope that you will be able to visit our campus after the conference, see our geotechnical laboratories and talk to our staff about their on-going research.

OPENING CEREMONIES

Address
Victor F.B. de Mello
President, I.S.S.M.F.E.

r. Chairman, ladies and gentlemen, dear colleagues;

I am especially happy and honoured to be here among you, and to be addressing you as President of the International Society for Soil Mechanics and Foundation Engineering at an international geotechnical conference promoted by the very spirit of individual enterprise, neither by the .S. Member Society nor by one of the Technical committees presently working within ISSMFE. The topic is of the greatest significance, because the appraisal and reappraisal of case histories is at the root of our profession. ISSMFE was requested to co-sponsor this venue, and I eagerly concurred, recognizing that to begin with, the individual enterprising effort must be supported to resounding success, and, as a follow up, hopefully the perpetuation of the effort may be profitably funnelled through continuity and organization within the mainstream of group effort.

To begin with, may I heartily congratulate you, r. Chairman, and your co-workers of the Organizing Committee, on this initiative with which you jumped the gun on something that should have been promoted by the Member Societies and the International Society itself, in compliance with Terzaghi's emphatic calls right from the beginning of our profession's trajectory. Once again we find confirmed that irrespective of the type of society that surrounds us, it is through individual enthusiasms, capacities and efforts that the dynamics of life expresses its pioneering pushes. Churchill said that history is made by great men and chance; and further, with regard to the comparative function of group activity, he is reported to have commented that the trouble with all the Chiefs of Staff of Armies is that they always prepare very carefully how to fight the last war. In our endeavours, there is a well recognized complementary function for both contributions, because while some are intensely engaged in pushing forward, the group activity of Technical Committees should be distilling the acquired experience so as to hoard and husband the wealth of the past.

In a few days I shall be in Adelaide, Australia, at the 5th International Conference on Expansive Clays. That is another instance wherein at a time when most of the geotechnicians were concentrating attention on Boston Blue Clay and London Clay, some of our colleagues had the vision to push initiatives ahead of the Society, recognizing the vast regions of the world for which the direct application of conventional soil mechanics of saturated clays could lead to gross misrepresentation of the real problems and solutions of the necessary geotechnical engineering. Truly the group working on expansive clays has worked even more effectively than any formalized technical committee. However, while recognizing the inexorable nature of such initiatives, it is our hope that mutual benefits may be derived from coordination within the Society; the latter

merely hopes to avoid Brownian movement of initiatives.

You well know how much the U.S. Member Society means to the International Society. It was here, in Harvard 1936, that two great international men, Terzaghi and Casagrande, together with many other enthusiasts, laid the groundwork of the International Committee of geotechnicians. And it was with special recognition of that start, and is now with the greatest efforts and expectation, that we are working towards a very special Golden Jubilee Conference at San Francisco in 1985. The program of that Conference is aimed at priority interest in problems of professional engineering activity and case histories.

A subject and method so important is not circumscribed to conference venues. It must find a channel for continuous accumulation and digestion of data. Until now during the 3 years of my Presidency I have already had the pleasure and privilege of addressing conferences in as many as 26 of the 54 Member Societies, and a few more are yet on the schedule. All over the world I have felt deeply the eager sense of need of true internationalism and true participation. At the same time we must unfortunately recognize two distinct undercurrents. One of them pertains to the extremes of either the biggest or the least important Member Societies: these restrainedly express a questioning frustration "what do I get out of the International Society? Do we not get along quite as well without it?" It may well be that right now the Societies of average stature are the keenest supporters of the joint international effort. The other undercurrent has to do with individual members, especially the younger ones: their permanent complaint refers to the undefined steps of the ladder by which they might ascend within the international spectrum of debate and communion, for effectiveness in their professional activity and service. I have adopted the policy of accepting the formation of as many International Technical Committees as are volunteered by individuals and small groups: we merely try to guarantee a broader membership, for reasonably international representation. We are not utopian in expecting intense activity from more than a fraction of the membership: but we will not be criticized for not opening opportunities.

To each and all we say as I now say to you: "ask not what the Society can do for you, but what you can do for the Society." And, indeed, sheer numbers will prove that this statement of apparent altruism will turn out to be of significant self-interest. The moment each individual begins to pour his efforts into the collective stream, he becomes a recipient of the stream's own vigorous current contributed by the very many like contributors.

Particularly with regard to continued digestive work on Case Histories I therefore hope that this successful international venue may generate some volunteer propositions to constitute Technical Committees under the helpful aegis of ISSMFE.

I take this opportunity to submit a few comments on types of case histories and their role within

geotechnical engineering, and thereby within the interaction between civil engineering and human society.

Firstly let us be firm in not accepting as a case history any record that does not cover the complete experience cycle of an engineering project, from predesign investigation, through design, construction, inspection, monitoring, and a reasonable period of performance. At each of these steps we may well accept the routine level of semi-quantitative professional practice as prevails in the "silent majority of cases": for instance, visual inspection is an accepted practice, and so is, frequently, a conscientious visual monitoring; the important point, however, is that some indications must be supplied, even approximate, on each of the various links of the chain, no omitted steps being tolerable.

Secondly, since flagrant failures comprise the case histories that draw most attention, let us make an effort to recognize honestly the distinction between cases that must be classified as beyond the realm of existing knowledge or reasonable control, the cases classifiable as "acts of God," and those that are an unfortunate error as compared with the accepted state-of-the-art. The first group must be repeatedly used to educate human society in general: engineering is not science, not an "exact science"; neither can it presume to dominate unknowns and the broader magnitudes statistically possible of the forces or vagaries of Nature. If we presume to pose as near-gods in the Olympus of technology, we shall be doing it at such fantastic costs to society that general poverty and collapse of civilization can be foreboded as the outcome. Beyond a certain point the presumption of increased safety and/or perfection is bought at so low a benefit/cost ratio that lay society must be fully informed of the choices available, and must be made the final arbiter. All over the world, society is unwittingly setting itself criteria that are making the world too expensive for itself.

It is within this first group that we should situate such cases as the Malpasset Dam failure, on which it is enlightening to transcribe the noble words of Terzaghi's letter to Coyne, the designer; (cf. A. Casagrande, ASCE, July 1965, Vol. 91 SM4, p. 1): "Yet every fair-minded engineer will remember that failures of this kind are, unfortunately, essential and inevitable links in the chain of progress in the realm of engineering, because there are no other means for detecting the limits to the validity of our concepts and procedures." "The failure ... will serve the vital purpose of disclosing a factor which in the past has not received the attention that it requires." "The occurrence of failures at the borderline of our knowledge is governed by the laws of statistics, and these laws hit at random. None of us is immune." "The sympathies of your colleagues will be coupled with their gratitude for the benefits which they have derived from your bold pioneering."

Besides educating human society regarding our candid limitations in the profession, there is the ever more important educational reminder to our own selves of the need of humility before

nature, and before any attempt to advance over proven practice in steps too big.

With regard to the category of flagrant failure that do represent errors in comparison with established knowledge, we must devise means of recording and criticising the cases without a implication to the colleagues who happened to have been the unfortunate vehicle of the failing. Who will throw the first stone; who will be the next glass roof? But, unless we candidly recognize the incidence of the error, can we morally claim respect from the other citizens? And can we diligently work towards eradicating the errors if we deny, mask and/or deliberately silence them? We must devise means of plotting these case histories into graphs and tabulations and analyses but through secrecy codes that respect the anonymity without in any way thwarting the facts of significance.

With regard to both the above types of flagrant failures that make headlines there has been a continuous flow of individual cases reported. We are failing our younger colleagues and human society in general by not collating such individual "news items" into well digested lessons. Individual cases can be outliers in the statistical universe, and may thus fail to prove anything, or may even prove quite misleading.

Finally, I wish to emphasize that it is from the multitudinous cases of greater or lesser degree of misbehaviors that as a profession we must draw our lessons on routine factors of correction or adjustment to apply to our computations and decisions. These failures are like the "technical K.O." in boxing: they do not draw excitement either from the public or from ourselves. But they stab at the heart of our credibility in the routines of professional practice, and they cumulatively tend to make our works more and more expensive. Why is it that we must feel ashamed of a few cracks in a building and thereby in the following case prefer to offer the client a much more expensive solution, merely to avoid the very risk of such a minor shame? Is it not much more of an engineering failure if the first costs of an industry, its very foundations, are made to be 3 or times higher, and the client is not made aware that the real choice should be his? It behoves us to present to society, our client, the best computable estimates of alternate solutions, a incremented benefit/cost estimate ratios: the real choice of level of risks, responsibilities and profits belongs to the owner. "No taxatio without representation."

Case histories are of different types of projects, and therefore, in each case, through the type of project under consideration, they are associated with other Technical Committees. Let us foster maximized interaction within the matrix of geotechnical service to all branches of civil engineering and all Technical Committees, with enthusiastic recognition of the different approaches and aims. May we thus become another tributary to our common international geotechnical efforts.

In cherishing our different angles of approach and direction, for complementary contribution, let us humbly recall the words of Hipocrates (500 B.C.), one of the first doctors recognized

having concentrated on observational methods
in medicine: "Life is short; Art is long; Know-
ledge is elusive; Experience is treacherous;
Judgement is difficult."

On behalf of ISSMFE I wish this conference every
success, both technically and socially.