

## CERAMAH TEKNIK (TECHNICAL TALK)

Robert C. Speck: Rock slope study and stabilization in Pittsburgh, Pennsylvania: a case history

### Laporan (Report)

The talk was held on the 27th November 1989 at the Department of Geology, University of Malaya. It was attended by about 30 members of the Society.

The talk was in two parts. The first part dealt with a case history on rock slope stabilization in Pennsylvania. The abstract of this part of the talk is given below.

### Abstract

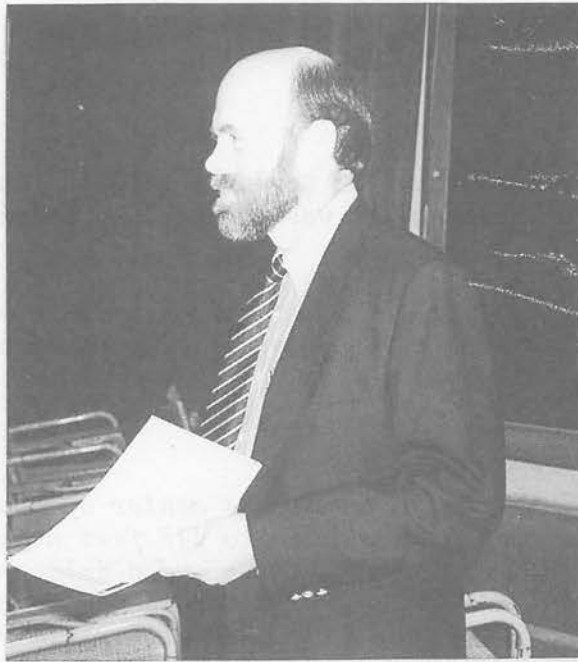
*The Duquesne Bluff, located near the center of the city of Pittsburgh, Pennsylvania, is 4240 feet long and 60 to 115 feet high. A 4-lane boulevard runs directly along the crest of the slope and a 6-lane highway parallels its base. In plan, only 50 to 95 feet separate the near curbs of the two roadways. A major rock-fall in April, 1978 ultimately resulted in the inclusion of the slope in the Pennsylvania Department of Transportation's Parkway Safety Update Program.*

*Failure modes occurring along the length of the slope included plane, wedge, toppling, and rock-fall types. General disintegration of the rock surface was also present. Two sets of tectonically-induced joints, as well as vertically-oriented stress-relief joints, and joints formed by the wet-dry, freeze-thaw weathering cycles were responsible for the various modes of failure.*

*From a cost effectiveness standpoint, no single type of corrective measure was found to be appropriate for the entire slope. Consequently, the slope was divided into a series of design zones based on a judgement of the potential for particular modes of rock failure, the possible consequences of rock failure, and the most promising methods for correction. Five categories of design zones were thus established. For comparative purposes, several candidate treatment programs were developed in the context of the design zones. The program ultimately adopted included construction of a reinforced concrete band to retard weathering of soft rock strata which historically had led to the development of large overhangs. The program also included rock trimming by mechanical methods (crane-mounted hydraulic hammers and a crane-mounted continuous miner), and the use of rock bolts and wire mesh and other techniques. The entire program is expected to cost 1.5 to 2.5 million US dollars.*

In the second part of the talk, the speaker showed a series of slides on engineering problems and touristic views in Alaska. The engineering problems associated with permafrost in Alaska include thermal sinkholes (similar to sinkholes in karst areas), subsidence or soil failures due to melting of ice in the soil subsequent to road or housing construction, special preventive or remedial measures using thermal piles and elevated structures, etc. Beautiful scenes of various parts of Alaska and the University of Alaska-Fairbanks during the summer and winter seasons were also shown.

Some lively discussions on the rock slope stabilization measures followed, after which the meeting adjourned at about 6.45 p.m.



ROBERT C. SPECK

Footnote: The speaker also expressed interest in getting Malaysians to undertake undergraduate or post-graduate studies in the University of Alaska-Fairbanks. The University offers low-cost education with possibility of scholarship awards. Members who are interested can write to: Dr. R.C. Speck, Dept. of Mining & Geological Engineering, Univ. of Alaska-Fairbanks, Fairbanks, Alaska, U.S.A.

Tan Boon Kong

\*\*\*\*\*