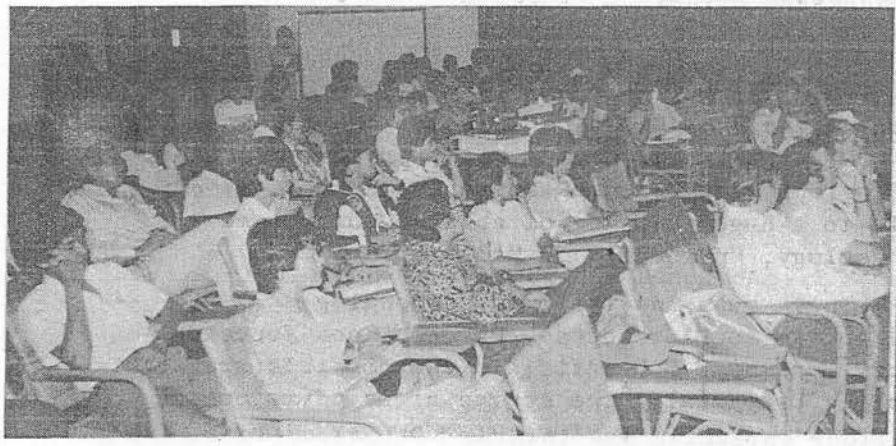
V. SCHENK: Geotechnical investigations for tunnels and open cuts of a new express railway system in the Federal Republic of Germany.

The first Technical Talk in Kuching was held on 8 December, 1983. Despite a heavy thunderstorm, a total of 16 members and civil engineers gathered at the Conference Room, Geological Survey of Malaysia, Kuching to listen to Dr. Volker Schenk. Dr. Schenk is the Chief Geologist and Head of the Geotechniques Division of Lahmeyer International, Frankfurt and the engineering geology expert for the feasibility studies of the Pelagus and Bakun hydroelectric projects.

Dr. Schenk talked on the geotechnical investigations for tunnels and open cuts for the new express railway system linking Hannover in north Germany to Wuerzburg in the south, a distance of about 330 km. This project, one of the largest traffic projects in Europe, includes a total of 118 km of tunnel and 192 km of open cuts, dams and bridges.

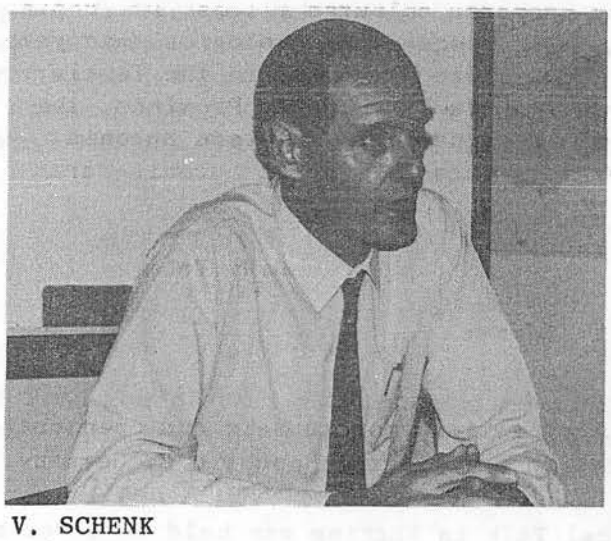
The new railway system will carry trains with speeds of up to 250 km/h and, hence, has to be designed with wide-radial curves and low gradients. In view of the dense population along the route and

TECHNICAL TALKS



The audience at GLH, University of Malaya

K. ROBINSON



V. SCHENK

C.H. Kho giving the vote of thanks

General view of part of the audience at Kuching

the demands of environmentalists, the railway system has to be so routed that it harmonises with the infrastractural, geographical settings.

For investigation, planning and design purposes, the railway system is subdivided into numerous planning sections each of which has a length of approximately 30 km, with a few exceptions such as areas of rail road stations.

The tunnels have cross-sectional areas of 120-150 m^2 and are generally at least 10 m high. The geology encountered by the tunnels are the marls and limestones of the Middle Triassic Muschelkalk system and sandstones, shales and siltstones of the Lower Triassic Buntsandstein system.

Talking as example planning sector 4 located between Geottingen and Kassel in northern Germany, extensive geotechnical investigations were carried out for the design and construction of 3 tunnels with a total length of 15.5 km and 5 km of open cuts and bridges. These field investigations included drilling a total of 7,500 m of drill cores with individual borehole to a maximum depth of 150 m, geophysical logging mainly gamma log and resistivity log, water-pressure tests, and in situ rock mechanical tests including dilatometer, flat jack and shear tests.

Stability analyses were carried out to determine the safe design for open-cut slopes in soil and rock. Slope stability calculations always present some problems. In some cases, open cuts were designed with an initial slope of 1:1 for construction and subsequently backfilled to a slope of 1:1.5.

Dr. Schenk answered a number of questions raised by the audience. Mr. C.H. Kho of the Geological Survey of Malaysia proposed a vote of thanks on behalf of the Society for Dr. Schenk's interesting talk.

Denis Tan

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