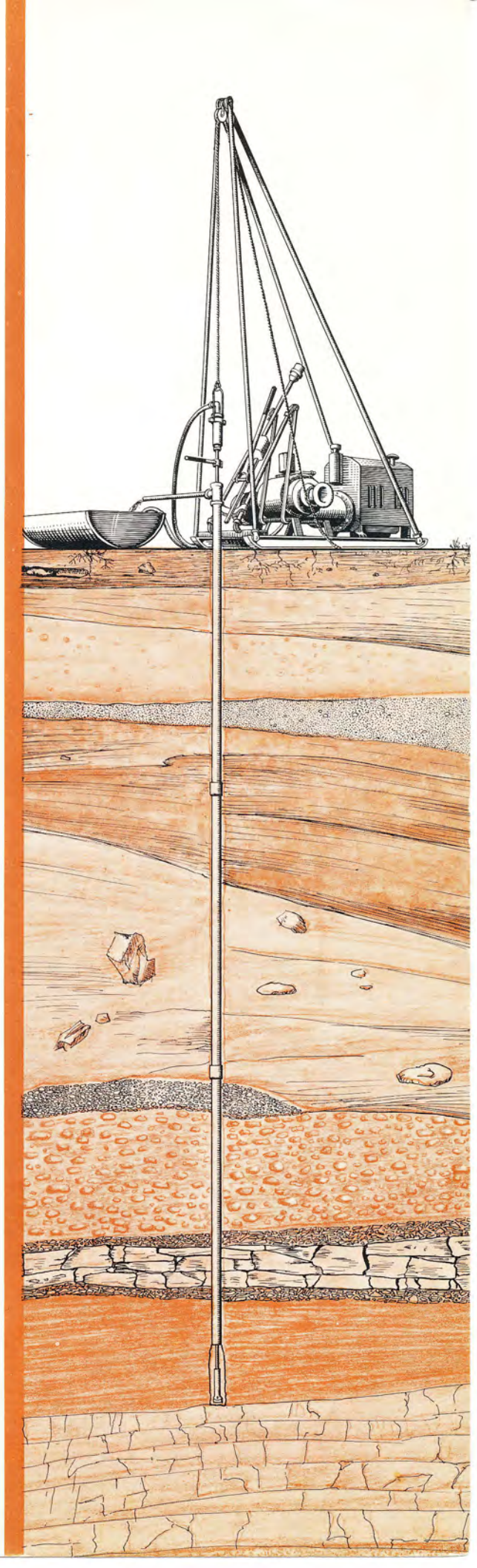
CORNELL, HOWLAND, HAYES & MERRYFIELD

Consulting Engineers

SOILS INVESTIGATION SERVICES



C·H₂·M
CORNELL, HOWLAND, HAYES & MERRYFIELD
CONSULTING ENGINEERS

Cornell, Howland, Hayes and Merryfield provide the following services in soil mechanics and foundation engineering, including field investigations, testing, and analysis of data in clear-cut usable reports.

FIELD INVESTIGATIONS

On an initial reconnaissance, the soils engineer develops a drilling and sampling program. The drilling can be done by a contract driller using CH_2M sampling equipment or by Subsurface Exploration Company, a CH_2M subsidiary whose mobile drilling and sampling equipment is available to move to the job. Borings are made with hand earth augers or rotary-boring, wash-boring, or diamond-drilling equipment. Split tube and special sampling devices are provided to recover samples. Borings are accurately logged and the soil samples are examined in the field by a CH_2M engineer so that the field procedure may be modified if necessary. Penetration tests are made during the sampling or probing operations, and the in-place characteristics of the soil are further established by such procedures as bearing and water pressure tests.

TESTING

A well-equipped soil mechanics laboratory is located at the Corvallis office. Testing is performed under the direct supervision of an experienced soils engineer. Special test procedures are devised for meeting particular problems. The laboratory is equipped for testing as follows:

- Atterberg Limits
- California Bearing Ratio
- Consolidation
- Direct Shear
- Field Density
- Grain Size Analysis
- Permeability
- Moisture Determination
- Moisture-Density (Proctor & Modified)
- Relative Density
- Specific Gravity
- Triaxial Shear
- Unconfined Compression

KEY PERSONNEL

James C. Howland, Partner in Charge. Received his basic soil mechanics training at the Massachusetts Institute of Technology under the late Donald W. Taylor. Since 1939, he has worked on soils and foundation problems with the Standard Oil Company of California, U. S. Army Corps of Engineers, and CH_2M.

William A. Watters, Soils Engineer. Received his basic soil mechanics training at Oregon State College and has been in soils and foundation work since joining CH_2M in 1950. He recently completed the Massachusetts Institute of Technology course on earth embankments.

James M. Bell, Retained Consultant. Head of Soil Mechanics at Oregon State College. He has an M.S. degree from the California Institute of Technology, specializing in soil mechanics. Formerly soils engineer with Converse Foundation Engineering Company of Pasadena, California.

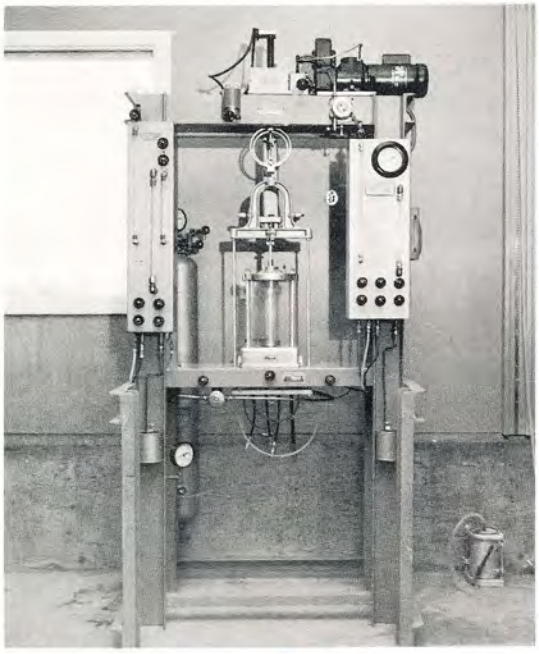
Roger W. Lindquist, Soils Engineer. Joined CH_2M in 1955 after graduation from Oregon State College. Completed M.S. degree from the University of Minnesota in 1958, specializing in soil mechanics and hydraulics.

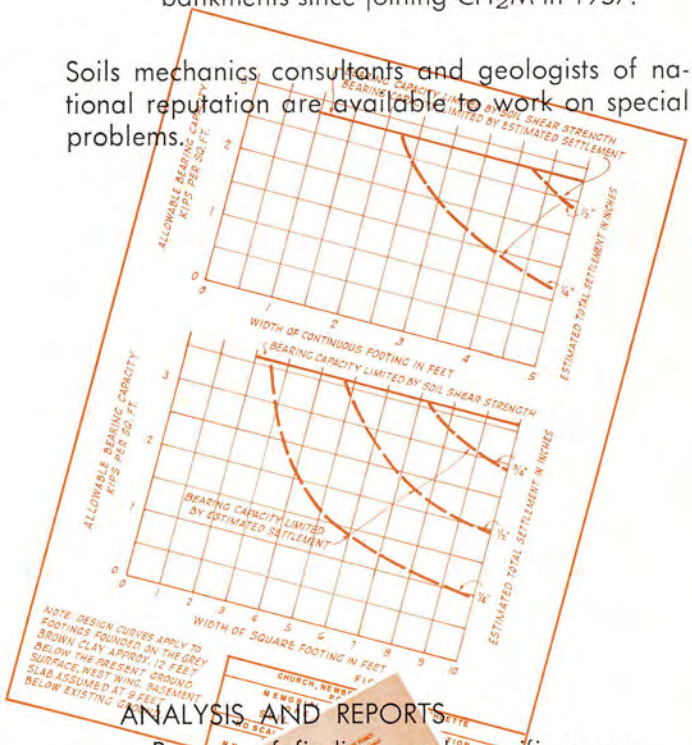
Vaughn G. Sterling, Soils Engineer. Received soil mechanics training at Oregon State College. Has worked extensively on dams and embankments since joining CH_2M in 1957.

Soils mechanics consultants and geologists of national reputation are available to work on special problems.

At left is a photo of a portion of our soil mechanics laboratory.

Below, at left, is an unconfined compression test being conducted. Our triaxial shear equipment is shown below.





ANALYSIS AND REPORTS

Reports of findings and *specific recommendations* are presented in clear, concise, and understandable terms. Supporting data are included, and design recommendations are presented by means of curves and tables to permit rapid and flexible reference by the design enginer.

Some of our Soils Mechanics Projects

Albany General Hospital (James L. Payne, Architect)
Albina Wall Investigation (Union Pacific Railroad)
Armed Forces Housing—Adair, Hebo & North Bend, Oregon (U. S. Air Force)
Astoria High School (Stewart & Richardson, Architects)
Beaverton Swimming Pool (Williams & Martin, Architects)
Beth Kaiser Hospital (Wolf & Zimmer, Architects)
Big Creek Dam (Newport, Oregon)
Carmen-Smith Project Preliminary Rock Fill Dam Design (Eugene Water and Electric Board)
Coos Head Naval Laboratory
Defense Installation, Adair Air Force Station (C of E)
Eugene YMCA (Hamlin & Martin, Architects)
Eugene, City Airport
Eugene High School
Eugene Water and Electric Board Warehouse
Hood River Community Hospital Addition
Interstate Tractor Co., Eugene and Coquille Stores (Skidmore, Owens and Merrill, Architects)
John Thompson Dam (Blodgett, Oregon)
Juneau, Alaska, High School (Linn Forrest, Architect)
J. C. Penney Co. Store, Eugene (Percy Bentley, Architect)
Little Pudding River Flood Control (Soil Conservation Service)
Olallie Dam and Barrier (Georgia-Pacific Paper Co.)
Oregon Forest Research Center (James L. Payne, Architect)
Oregon Metallurgical Corporation
Pacific Telephone & Telegraph Co., Albany, Corvallis, Newport and Baker Exchanges
Pacific Telephone & Telegraph Co., Albany and Jennings Lodge Shop Buildings (Chris Jeppsen, Architect)
Ramsey Lake Industrial Area (The Port of Portland)
Safeway Stores (10 Locations)
Salem Memorial Hospital (James L. Payne, Architect)
City of Dallas, Ore., Dam & Water Supply Reservoir
Umpqua Bowling Lanes, Reedsport, Oregon
Western Land Development Co. (Inverness Industrial Area, Portland, Oregon)
Oregon Pulp & Paper Co., Salem, Oregon (Sulphite Waste Liquor Lagoon)
Crown Zellerbach, West Linn, Oregon (Sulphite Waste Liquor Lagoon)
Rock Creek Dam (Corvallis, Oregon)
Valsetz Dam, Reconstruction (Valsetz Lumber Co.)
Cottonwood Dam, Reconstruction (Lakeview, Ore.)
City of Drain, Oregon, Water Storage Reservoir and Dam
Wah Chang Corporation

Cornell, Howland, Hayes and Merryfield also offer services in other civil engineering fields and in electrical and mechanical engineering.

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