

1933

Hale sutherland correspondence and other material relating to fritz engineering laboratory expansion, 1933

Hale Sutherland

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UNIVERSITY OF CALIFORNIA
DEPARTMENT OF CIVIL ENGINEERING
ENGINEERING MATERIALS LABORATORY
BERKELEY

I.L.
Please put
in folder re
big machine -
by

September 30, 1933.

Professor Hale Sutherland,
Lehigh University,
Bethlehem, Pa.

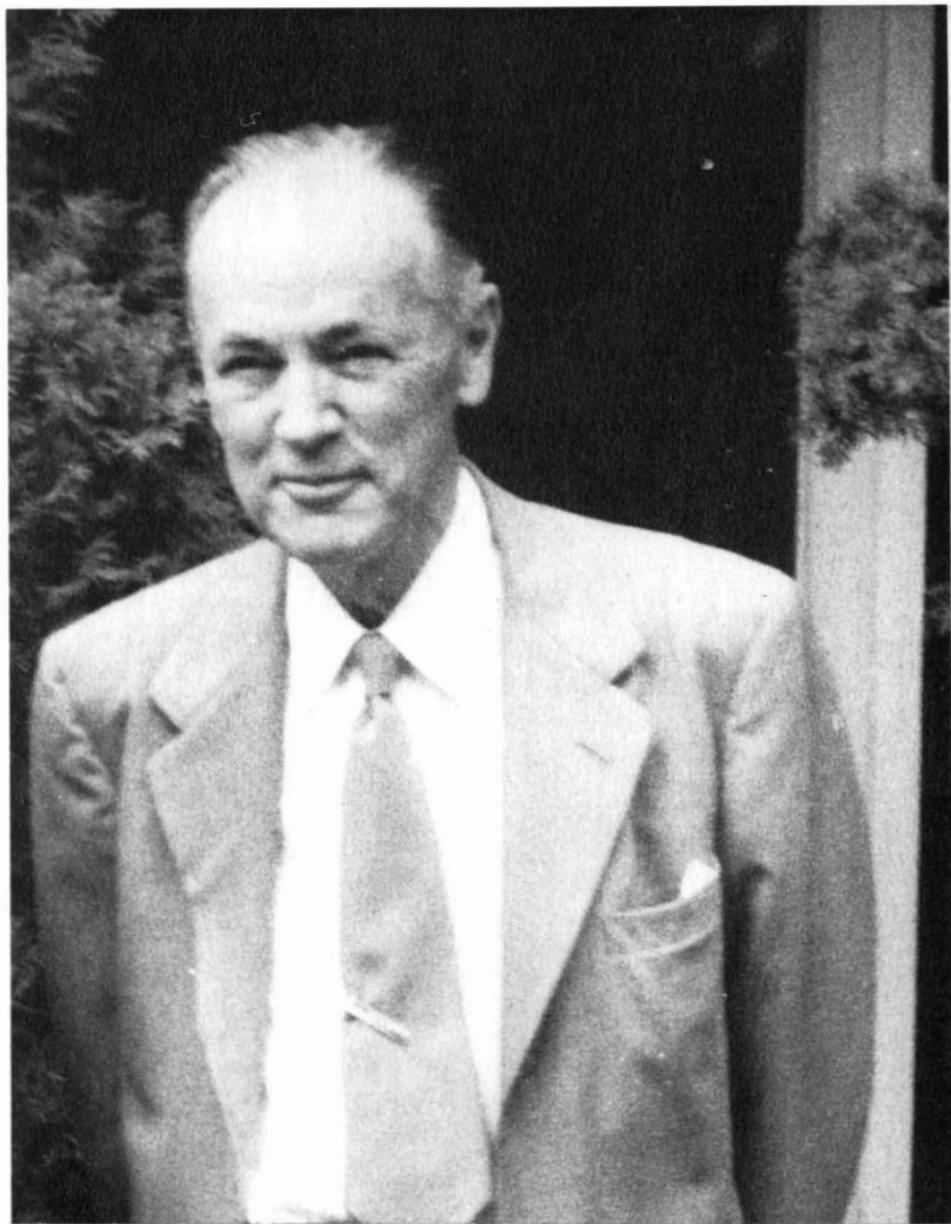
Dear Professor Sutherland:

Replying to your letter of September 21, we have found very great use for our 4,000,000-lb. machine. Unfortunately, however, most of the work we have done has been in connection with public projects in which we have made no charge for use of equipment, so that from a financial standpoint so far the investment would not be considered as a paying one. Without going into our books, I estimate that during the past eighteen months, since the machine was installed, the total income from this source has been about \$2000.

Very truly yours,

Raymond E. Davis,
Professor of Civil Engineering.

RED:NB



**Hale Sutherland, head of Department 1931-1947
Fritz Lab director 1938-1947**

BALDWIN-SOUTHWARK CORPORATION

PHILADELPHIA, PA.

Nov. 22, 1932

Professor Hale Sutherland,
Lehigh University,
Bethlehem, Pa.

My Dear Professor Sutherland:-

Replying to your interesting letter of Nov. 17th, it seems that there is no argument half so effective as the naming of actual instances where a large testing machine would be required such as you have done.

// Less than a year ago, I received an inquiry for testing steel tie rods in tension which would exceed 1,000,000 Lbs. and I was unable to locate anyone in this region who could do this job. This inquiry was received from the Federal Water Service Corporation, 27 William Street, New York City, *letter enclosed*

// We also had an inquiry from Mr. R. S. Johnston, Engineer of Tests for the Port of New York Authority. He indicated very strongly that he had frequent demands for testing full size or half size tension and compression members. You will recall that afterwards he took his work to the Bureau of Standards and carried on tests which were later published extensively and of which I have a copy of the original in *The Iron Age* of Nov. 4th, 1929, entitled "Tests on Large Columns of ~~Metal~~ Alloy Steel" which were half size members of the Hudson River Bridge Column. Mr. R. S. Johnston is now Director of Research of John Roebling Sons Company.

// A great deal of work has been done at the Bureau of Standards which would otherwise have been carried on in College Laboratories had facilities been available. I am thinking among other things of the tests on the cables of the Mount Hope bridge which failed. The Frederick Snare Corporation desired tests on subway columns which, as you recall, they made partially on the 4,000,000 Lb. California machine *before* it was shipped.

// Our own company could utilize on a number of occasions the high capacity testing machine of 4,000,000 Lbs. or even greater for the calibration of pressure plugs which we build for rolling mills. These pressure plugs are shown in our Bulletin #27 enclosed on page 17. I am enclosing a photograph of a 4,000,000 Lb. plug.

C.E. Department
November 29, 1932

Mr. Francis G. Tatnall
Baldwin-Southwark Corp.
Philadelphia, Pennsylvania

Dear Mr. Tatnall:

Your long letter was very interesting and valuable. The material therein has been incorporated in a report of the matter handed to Dr. Richards. Do you find any signs of optimism, economically, in industry. Apparently the pessimism here about is so deep that action is practically improbable at this time.

Your note relative to the interferometer at the M. I. T. has been filed for future use. Thank you for the help.

Sincerely yours

Hale Sutherland
Professor in Charge of Department

HS:Y

Nov. 22, 1932

11
Mr. F. O. Dufour a Lehigh graduate and formerly in charge of the Civil Engineering Department at Lafayette College advises me, to-day, that his intention to get a high capacity machine prior to his resigning at Lafayette to become a Consulting Engineer for the United Engineers and Constructors was based on a number of inquiries for large testing originating in the Lehigh Valley and at Ingersoll and Rand Company. He states that the number of tests at Lehigh turned over to him every year, which were greater than Lehigh's capacity, would have paid the carrying charges on a large machine and he was extremely anxious to obtain a large machine on the basis of test work exceeding Lehigh's capacity.

11
The Board of Water Supply, City of New York, Mr. Ray Eury, Mechanical Engineer, sometimes requires large capacity testing. Two years ago both Jones and Laughlin Steel Corporation and Youngstown Sheet & Tube Company, ran a series of tests on welded steel pipe, and they were forced to go to the Gould Coupler Company, Depew, N.Y. who had a 1,000,000 Lb. machine, because of lack of ~~other~~ ^{their} facilities, especially a machine to take long enough specimens. I enclose a photograph of one of these welded pipe tests. Spang-Chalfant Company, Ambridge, Pa., is now undertaking extensive Research tests on rotary drill tubing for oil wells which require exceptionally long tests. Mr. G. M. Eaton is in charge of ^{the} Research. 11

There is bound to be a further extension of the mass concrete studies using the very large concrete cylinders 3' x 6'. The standard cylinders for dam tests are now 18" diameter x 36" high.

The following Schools are very actively flirting with the installation of large machines:

2
New York University has recently appointed a Committee of Alumni to prepare plans for the establishment of a large laboratory at University Heights. This is going forward actively I have been advised by Professor C. T. Schwarze who is in charge of Civil Engineering at that Institution.

Columbia University has the money for a large machine of 4,000,000 Lbs. capacity or larger but have not yet obtained a site for the laboratory, although Dean Barker advises me that this is nearer a solution than ever before. I am enclosing a newspaper clipping from the New York Times discussing Columbia's undertaking. I am lacking the entire story on this but this paper can be obtained.

If any other pertinent data occurs to me, I will let you know. In the meantime, thanks for the opportunity of offering this much information. Yours sincerely,

FGT:N- enc. Bulletin 27-photo

Francis S. Sutherland

File - New
Tatnall
March

BALDWIN-SOUTHWARK CORPORATION
SOUTHWARK DIVISION
PHILADELPHIA, PA.

✓
Aug. 12, 1932
SN-22532



Professor Hale Sutherland,
Ipswich, Mass.

Dear Professor Sutherland:-

This is a belated reply to your letter of July 7th, but it has taken some time to assemble the data required to reply.

We will undertake to furnish and completely install in your laboratory at Bethlehem, excluding foundation, including electrical work, a testing machine similar to the University of California machine for a "not-more-than" price of \$76,500.00. This represents an estimate made at a time when labor and materials were at an absolute minimum. We will guarantee not to exceed this price ~~and guarantee~~ at any time in the future, regardless of the trend of prices.

We have allowed a 5 percent margin for ~~the~~ desired changes to be introduced in the design provided they are not of a major classification. You can undoubtedly determine for yourself what might be called major changes, but at any rate you will always find us anxious to co-operate in introducing such changes as you may desire.

Relative to a "not-less-than" price, this will depend upon what special concessions can be agreed upon between the Lehigh University executives and the Baldwin-Southwark management. Under any condition, you will be given the benefit of any possible reduction in costs and prices that might later develop.

It will be impossible to accept such an enticing invitation for a swim in your creek at high tide. I just can't seem to find time to go driving and visiting for pleasure. July and August are no different from the rest of the year on this job, despite my desire to swim with you in the creek during these dog days. It would be fun to talk testing machines while swimming.

F.G.Tatnall:FN

Very truly yours,

BALDWIN-SOUTHWARK CORPORATION

By _____
Southwark Division

P.S. Must there be a formal letter on this??

UNIVERSITY OF CALIFORNIA
DEPARTMENT OF CIVIL ENGINEERING
ENGINEERING MATERIALS LABORATORY
BERKELEY

January 13, 1932.

Professor Hale Sutherland,
Lehigh University,
Bethlehem, Pa.

Dear Professor Sutherland:

Your letter addressed to me in care of the Baldwin-Southwark Corporation at Philadelphia reached me just as I was about to start on my return journey to the Coast. Consequently I delayed replying until I reached home.

Of course, it is perfectly obvious that not every institution in the country should have a 4,000,000-lb. Universal testing machine, since the amount of investigational work in the field of engineering materials requiring a machine of this large capacity will always be limited. Here in the West, however, we have seen the tendency toward the testing of full-size specimens increase from year to year, until it has become perfectly evident that a machine such as that which we are purchasing is in real demand. From such studies as we have made, I feel confident that this machine will greatly increase the sphere of usefulness of our Engineering Materials Laboratory and will prove a wise investment. This has been the experience of the University of Illinois with its 3,000,000-lb. machine.

It would seem somewhat logical to suppose that you, located as you are in the East, would find as large use for a testing machine of the type we are purchasing as would the University of Illinois or the University of California.

I hope you will find it possible to visit the Baldwin-Southwark plant and see this machine. I think you will find it well worth your while. We have given a good deal of thought to its design, particularly as to details which would facilitate its operation and would increase the sphere of its usefulness. I wish especially to call your attention to the control features, which are not duplicated on any machine heretofore constructed.

With best regards, I am,

Very truly yours,

Raymond E. Davis,
Professor of Civil Engineering.

RED:NB

February 5, 1932

Professor R. E. Davis
Dept. of Civil Engineering
University of California
Berkeley, California

Dear Professor Davis:

May I congratulate you most heartily upon the magnificent testing machine which you are to install at Berkeley. I visited the Baldwin-Southwark plant a few days ago and was very much impressed. It would seem that you have here refinement of action and control never before attained, even in much smaller machines.

Sincerely yours

Hale Sutherland
Professor in Charge of Department

HS:Y

A FOUR MILLION POUND TESTING MACHINE
FOR FRITZ ENGINEERING LABORATORY

When the Fritz Engineering Laboratory was opened, its 800,000-lb. Riehle Universal testing machine was one of the largest in the country. Today this giant of twenty years ago is dwarfed by a half dozen or more of large machines brought into being by the ever increasing demands for full size tests and other heavy service. For example, the use of large aggregate concrete has developed a demand for testing cylinders as large as 3 by 6 ft. with a breaking strength of 2,000,000 lb. or more.

Within the last two years we have been called upon, on several occasions, to make tests beyond the 800,000-lb. range. In March, 1931, the Hudson Coal Company sent samples of mine supports which required loads more than 800,000 lb. and incidentally broke the main levers of our machine. Later the same company inquired regarding testing machines in the East which would be capable of testing arches of strength in excess of 800,000 lb. Last week this company sent eight samples of mine supports for comparative tests and none of them broke at the capacity of our large machine.

About a year ago the Lukens Steel Company wanted to test some large size riveted joints. Due to the capacity of our machine only relatively small joints could be tested. Last spring the same company sent us samples of 3-in. thick plates for tests, and only the yield-point strength could be determined on these samples.

During the planning of the American Concrete Institute Column Investigation the Committee decided that columns of only 8-in. diameter could be tested in the machine at Lehigh University, and all larger columns were consequently scheduled for the University of Illinois.

The facilities for this heavy work are few.

University of Illinois -- 3,000,000 lb. tension and
compression

University of California- 3,000,000 lb. tension and
4,000,000 lb. compression

Bureau of Standards - - - 1,150,000 lb. tension and
2,300,000 lb. compression

John Roebling Sons Co. - 2,000,000 lb. tension

American Bridge Company at Ambridge, Pennsylvania -
horizontal tension machine for eye-bars which is
rated at several million pounds capacity. It is
not classed as a high-precision machine as it is
a hydraulic press with gages reading load as a
function of pressure.

There are several other large machines which are in the same class as the last. A large eastern university is understood to be contemplating the installation of a machine of 10,000,000 lb. capacity when its plans for new engineering buildings go forward.

It is not desirable that every college laboratory be equipped with a machine rated in the millions of pounds. However, the leading institution will have such machines. Lehigh has been and should remain a leader in the field of structural testing.

The most impressive machine today is that recently installed at the University of California. A complete description is given in the attached article from the ENGINEERING NEWS-RECORD of February 11, 1932. Photographs of the machine are here included, and also that of the 3,000,000-lb. machine at the University of Illinois.

A duplicate of this 3,000,000-lb. tension-4,000,000-lb. compression machine can be installed in the present Fritz Engineering Laboratory in the east end at the lower floor level. To accommodate its great height (and no reduction of this should be considered) it will be necessary to lower the floor to the level of the present canal, with a deep pit for the parts of the machine below floor level. This will necessitate the removal of the mezzanine floor and the present hydraulic laboratory equipment. It is rather obvious that the proper place for the hydraulic laboratory is the Packard Laboratory. There are attached, sketches showing Fritz Laboratory and the proposed installation.

The Baldwin-Southwark Corporation will install complete, a duplicate of the 3,000,000-lb. tension-4,000,000-lb, compression machine at the University of California for \$76,500; the foundation will add \$ to this sum; another \$ will be required to remove the present hydraulic laboratory equipment to Packard Laboratory; a total of \$

It is to be expected that the Baldwin-Southwark Corporation will make a liberal donation in the interest of advertising. It is believed their donation to the University of

California totalled \$20,000. This machine would be of use to many of the industries in this section. It is likely several of the larger organizations will be glad to help in the purchase.

Through the work of the late Professor Slater and Professor Lyse, his successor, Fritz Laboratory has steadily maintained its leading place among the technical schools in the work of advancing our knowledge of structural materials and structural mechanics. With this machine Fritz Laboratory resumes its place as one of the leading structural materials laboratories in matter of equipment.