Half-scale model of two-lane bridge representing two, 66-ft. spans of prestressed girders with composite deck, shown under load test in PCA's Structural Laboratory.

Note 800-lb. blocks of concrete suspended from girders. These were required in order that self-weight stresses in model should be same as in full-scale bridge.
The Portland Cement Association recently climaxed their extensive studies of a prototype two-span continuous prestressed concrete bridge with a test to failure at their Structural Laboratory in Skokie, Ill. The two-lane bridge was a half-scale model representing sixty-six-foot spans of Type III AASHO-PCI prestressed girders with a composite concrete deck. The spans were made continuous for live loads by normal deformed reinforcing bars placed longitudinally in the deck slab over the intermediate support.

Following extensive service load tests, the bridge was loaded to failure at the center of one span by a pattern of loads simulating the distribution of loads in one equivalent military loading vehicle. Punching shear failure of the deck occurred at a load equivalent to 11-1/2 times the weight of the design vehicle. This local failure in the deck in turn led to a failure of the center girder in the region of the deck failure. The other girders of the bridge recovered from their deflection on removal of the load, all cracks closing. If this unlikely load had been applied to an actual bridge using this form of construction, the bridge would still be serviceable to restricted traffic in spite of the damage. After failure of the bridge, a survey of the slab over the intermediate support revealed that cracking in this region was well controlled. The cracks were narrow and well-distributed.

In addition to the use of continuity reinforcement, other items of interest in the construction of the bridge were the omission of diaphragms within the span—the slab providing all lateral load distribution; the use of bond and stirrups only to transmit horizontal shear between the prestressed girders and the cast-in-place deck slab, and the use of prestressed girders without end blocks and prestressed with straight strands only.

Prior to the test to failure numerous tests were made at service load level and for small overloads, to determine the behavior of the bridge for various dispositions of load. Over 30,000 items of data were collected during these tests which will enable a most complete picture of the bridge's behavior to be built up. The experimentally determined influence surfaces and load distribution coefficients will be compared with values calculated using various forms of theoretical analysis.

The loads were applied during the test to failure and during the overload tests by hydraulic rams situated under the test floor acting through heavy pull rods. During the service load tests two concrete blocks, each weighing five tons, were placed at fifty different locations on the bridge deck to enable the influence surfaces to be traced out experimentally.

When a structure is scaled down in size the self-weight stresses in the model decrease in proportion to the scale factor. In order that the self-weight stresses in the model bridge should be the same as in the full-scale bridge it was therefore necessary to hang 800-lb blocks of concrete from the girders before the deck slab was cast. These blocks may be seen in the photograph of the test in progress.

Earlier tests at the PCA Laboratories have demonstrated that it is entirely practical and feasible to produce continuity between prestress-prestressed girders by placing normal deformed reinforcing bars in the cast-in-place deck slab, and filling the space between the ends of the girders with concrete as part of a diaphragm. Elastic analysis of this form of connection would appear to indicate that the sum of the compressive stresses at the bottom of the girders due to prestress and live loads would make this zone vulnerable to compression failure. The PCA tests showed that this region is apparently not critical in spite of the high nominal compressive stresses at working load. A large range of variables was investigated. It was concluded that, for normal amounts of continuity reinforcement, the precompression of the bottom flange of the girder could be neglected when calculating the ultimate strength of the connection.

The results obtained in the course of this investigation, and the conclusions drawn, are being published as a series of Portland Cement Association Development Department Bulletins. The title of the series is "Precast-Prestressed Concrete Bridges". Parts 1 and 2, "Pilot Tests of Continuous Girders," and "Horizontal Shear Connections". Bulletins D-34 and D35, are in course of publication, and other parts will be published in the near future.

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**Dickerson to Head PCAP During 1960**

W. Logan Dickerson, of Youngwood, Pa., was elected president of the Prestressed Concrete Association of Pennsylvania at the Association's annual meeting in Harrisburg, Nov. 19. Mr. Dickerson is president of the Dickerson Structural Concrete Corp., of Youngwood. In addition to Mr. Dickerson, other officers of PCAP include: John K. Zimmerman of Pennsylvania Prestress, Inc., York, Pa., vice president, and Earle Butts, of Dickerson Structural Concrete Corp., assistant Secretary-Treasurer.

Members of the state association are also members of PCI and include the following: American-Marietta Co., Pottstown, Pa., Concrete Pipe Co. of Ohio, Erie, Pa., Dickerson Structural Concrete Corp., Youngwood, Eastern Prestressed Concrete Corp., Line Lexington, New Enterprise Stone & Lime Co., Roaring Springs, Pennsylvania Prestress, Inc., of York, and Schuylkill Products, Inc. of Cressona.

**New Strand Plant In Jacksonville**

The newly organized Florida Wire & Cable Co. has set up a plant in Jacksonville, Fla. and begun manufacturing uncoated, stress relieved, seven-wire strand for prestressed concrete. Facilities in the new plant on North Lane Ave. include a modern 3/4-ton strandier, and electrically controlled heat treating equipment. The company is headed by E. Danciger an experienced wire rope engineer, a former vice president of Paulsen-Weber Cordage Co. of New York. Mr. Danciger's company is among the recently elected Associate Members of PCI.

**PCI Now in New Chicago Offices**

The previously announced move of PCI headquarters from Boca Raton, Florida to Chicago, Illinois, was effected without fanfare on November 15, 1959. Assistant Executive Secretary Norman Scott, (Executive Secretary after Jan 1), Hubert C. Persons, Publications Director, and a small staff occupy #1112, a four-room suite of some 900 sq. ft. in the Engineering Building. This is located at 205 W. Wacker Drive, almost directly across the Chicago river from the famous Merchandise Mart.
Use Double-T Slabs
In Shopping Center

Four hundred prestressed concrete double-T roof slabs from 40 to 70 ft. long were used in building the Southfield Shopping Center at Bridgeview, Ill. The structure contains approximately 100,000 sq. ft. of floor space. The double-T units were manufactured in the Lemont, Ill. plant of Crest Concrete Systems, Inc. The building was designed by A. J. Del Bianco, architect. Picture shows the canopy over the outdoor walkway formed by the double-T slabs supported by precast concrete architectural bents.

Producers’ Showcase...

Double-T Roof Layout
For Service Building

Prestressed concrete double-T roof and floor units were used in the service building of the Florida Power & Light Company’s new power plant at Port Everglades, Fla. The plant is being erected by the Bechtel Corporation of San Francisco. The picture taken from the top of the boiler plant shows details of the double-T roof layout which is to be covered with concrete. The double-T’s were furnished by Pre-Cast Corporation of Miami, Fla. The service building contains offices and supply rooms for the power plant.
Membership Applications Approved by Board of Directors

Applications for membership in PCI from the following organizations and individuals have been approved by the Board of Directors for the classifications shown:

**ACTIVE**

FLORENCE CONCRETE PRODUCTS INC.
P. O. Box 464, Florence, S. C.
Hugh Leatherman

NEW ENGLAND CONCRETE PIPE CORP.
99 Needham St.
Newton Upper Falls 64, Mass.
Robert A. Bierweiler

SPAN, INC.
Box 13212, Dallas, Texas
W. B. Morris

**ASSOCIATE**

CONSTRUCTION MACHINERY CO.
P. O. Box 120, Waterloo, Iowa
Warren A. Holden

FLORIDA WIRE & CABLE CO.
P. O. Box 6473
Jacksonville 5, Fla.
E. Danciger

PHILLIPS DRILL COMPANY
U. S. 12 & Liberty Trail
Michigan City, Ind.
Frank A. Werstein

JOSEPH T. RYERSON & SON, INC.
Post Tensioning Dept.
P. O. Box 8000A, Chicago 80, Ill.
Adolph Walser

VALLEY MANUFACTURING CO.
Valley, Neb.
Glenn Anderson

WILLIAMS DISTRIBUTING CO.
5407-26th Ave., N. E.
Seattle 5, Wash.
Arthur Williams

**PROFESSIONAL**

WILLIAM CHARLES CRAMER
454 Jefferson Ave.
Elizabeth, N. J.

INC. JOSE E. FERNANDEZ
Pestalozzl 1314-1
Mexico 12, D. F., Mexico

J. W. FOGWELL
P. O. Box 10368
San Antonio 21, Texas

DIOSDADO PEREZ FRANCO
P. O. Box 650
Havana, Cuba

BRUNO GAUTHIER
Pressure Pipe of Canada Ltd.
Montreal 29, Quebec, Canada

GROVER C. HAYNES
P. O. Box 2066, Asheville, N. C.

WALLACE T. HAZLEWOOD
1505 Parker St., Amarillo, Texas

HERMAN F. HEDDERICH
Pittsburgh Testing Laboratory
1330 Locust Street
Pittsburgh 19, Pa.

ARTHUR RANDOLPH HOTZ
321 Windsor Rd.
Wood Ridge, N. J.

A. N. S. KULASINGHE
Deputy Chief Engineer
Colombo Port Commission
Colombo, Ceylon

GROVER C. HAYNES
P. O. Box 2066, Asheville, N. C.

MELVIN RACKOFF
1033 W. 3d Ave.
Columbus 12, Ohio

BARRY ERIC REED
69 Compton Crescent
Northolt, Middlesex, England

WILLIAM MORLEY SUTHERLAND
P. O. Box 3004
Auckland, New Zealand

E. VAN WALSUM
111 Sunnyvale Ave.
Lakeside, Quebec, Canada

**AFFILIATE**

GUSTAVO CONEJO
P. O. Box XXXII, I. C.E.
San Jose, Costa Rica

JOHN B. EVANS
214 Greenview St.,
Jesup, Ga.

JOSEPH FIRNKAS
Northeast Concrete Products, Inc.
P. O. Box 26, Plainville, Mass.

ALBERT E. MARTIN
P. O. Box 320
Maple, Ontario, Canada

WARREN H. MOSES
P. O. Box 26, Plainville, Mass.

**JUNIOR**

EUGENE BECHAMPS
3240 N. W. 27th Ave.
Miami 42, Fla.

ARTHUR N. L. CHIN
P. O. Box 2176
University Station
Gainesville, Fla.

ARTHUR Y. HO
P. O. Box 411
Fredericton, N. B., Canada

BILLY R. STEPHENS
P. O. Box 6387
Alamo Heights Station
San Antonio 9, Texas

RICHARD L. WILLIAMS
1320-A, Grandin Rd., S.W.
Roanoke, Va.

**STUDENT**

DOUGLAS GORDON NUTT
P. O. Box 742
Fredericton, N. B., Canada

HENRY ROLOFF
840 W. Argyle St.
Chicago 40, Ill.

Named to Concrete Industries Board

Irwin J. Speyer, PCI Professional Member, has been appointed permanent representative of PCI to the Concrete Industries Board, Inc., New York City. The appointment was made on the recommendation of Chales C. Zollman, Chairman Technical Activities Committee. Members and directors of Concrete Industries Board, Inc. include leading trade organizations and contractors who use concrete products. The CIB has been instrumental in improving the quality of concrete construction in New York City. Former U. S. Navy Engineer, Admiral John J. Manning, is managing director of the CIB.
Report Progress on New Fire Test

An unofficial progress report from the PCI Committee on Fire Resistance rating, reveals that six double T slabs for the next fire test have been cast and are now stored in a controlled humidity room at Underwriters' Laboratories in Northbrook, Ill. The test slabs were manufactured in the plant of Precast Industries at Kalamazoo, Mich. on Dec. 12. Placing of the concrete in the forms was witnessed by A. H. Gustaferro, member of the PCI Committee, and also by a representative of the Underwriters' Laboratories.

The test members are of composite design with a 5-in. total slab thickness consisting of 2-in. of precast concrete and a 3-in. cast-in-place topping. Total depth of members is 17-in. Length is 17-ft. 9-in. and width 3-ft. 6-in. Of the six members which were cast, four will be used in the tests, one is kept for a spare and the other one, containing relative humidity cells, will be kept for reference.

Each stem of the member contains three, 14-in. deflected strands. The bottom strand is straight with 1½-in. cover and the other two are deflected to a common point at midspan with a 2-in. spacing at the ends. Stems are 12-in. deep; 4½-in. wide at the top and 2½-in. wide at the bottom. Elgin sand and gravel was used as aggregate.

It is hoped through the test program to obtain a two-hour fire rating for a prestressed concrete structural member with 1½-in. bottom cover over strands in a unit with more than two strands, using sand and gravel aggregate and with release strength of 3,500 psi. No date has been set for the start of the tests since it is essential that relative humidity of the test members be below 70 per cent. It is believed to be unlikely that this point will be reached for from six to nine months.

New Sonneborn Products

L. Sonneborn Sons, Inc., new PCI Associate members in New York City, announce that their Building Products division has developed new products applicable to the Prestressing field. Among these are “Sonofard”, a liquid retarding densifier and “Aerolith”, an air entraining agent. The Sonneborn organization has been active since 1903 in the development and manufacture of chemical accessories to basic construction materials, and is known for its development of concrete admixtures and surface treatments.

New Tensioning Units Are Offered by Simms

Simms Engineering Co., PCI Associate Members, manufacturers of equipment used in tensioning prestressed concrete strands, is offering three new units of varied capacities. These are: single strand tensioning units with 12-in., 36-in. and 50-in. pull; center hole rams with 6-in., 12-in. and 24-in. travel; and hydraulic pumps with maximum pressures of 3,000 psi, 5,000 psi and 10,000 psi.

Other features of the single strand tensioning units according to the manufacturer are a relief valve to prevent over-tensioning of strands, vertical adjustments made by a crank, bevel gears and threaded rod and jacking against the strand vise to eliminate manual positioning of strand vise.

The Simms line of center hole rams are light, portable units ranging in weight from 22 to 38 lb. facilitating movement on or between job sites. Literature on the complete line may be obtained by writing Simms Engineering Co., 5901 W. Patterson Ave., Chicago 41, Ill.

New Book Simplifies Design Procedures

Simplified information on the design of safe, economical structures of prestressed concrete is contained in “Practical Prestressed Concrete”, a new book just announced by McGraw-Hill’s Business Book Information Service. The author is H. Kent Preston of John A. Roebling’s Sons, a professional member of PCI.

According to a McGraw-Hill news release the book presents basic principles and design procedures with numerous examples in terms of simple arithmetic and standard stress and moment formulas familiar to all structural engineers. All design examples are based on Tentative Recommendations for Prestressed Concrete prepared by the ACI-ASCE committee 323.

Among the topics discussed are properties of prestressed concrete, design procedures, materials, pre-tensioned and post-tensioned methods and when each should be used, and the design of typical members, girders, piles and continuous structures.

Dubois to Represent PCI at Conference

The Prestressed Concrete Institute will be represented by its president, Randall M. Dubois, at a national construction industry conference scheduled for March 10-11, in Washington, D. C. The conference will be under the sponsorship of the Construction and civic Development department of the Chamber of Commerce of the United States.

In extending an invitation to all members of PCI to attend the conference, James F. Steiner, manager of the Development department said that the conference will look ahead at opportunities for the construction industry in the 1960’s; assess the problems, and discuss ways and means to progress for the benefit of the public and the construction industry.

New Masthead Design

This issue of PCIItems presents a new masthead design and also a new treatment of the address space on the last fold. In fact both front and back covers are an innovation—a sharp departure from the customary dress of PCIItems. As a future policy we hope to use cover illustrations which will be timely, dramatic and informative.
PCI Sponsored Course Draws 180 Engineers

A short course on prestressed concrete design, sponsored by the PCI and conducted at the University of Houston during November and December, 1959, attracted approximately 180 Houston engineers. This keen professional interest in prestressing was reported by Dr. Ardis White of the University's civil engineering department. Dr. White called the prestressing course the best and most consistently attended program of its type which has been presented in the seven years of his association with the University of Houston. He declared there is tremendous interest among engineers throughout the country, in part due to the fact that adequate courses were not previously offered.

Although the short course given in Houston was sponsored by the PCI, the program was arranged and conducted by local people.

Co-Chairmen Named on Convention Committee

PCI President R. M. Dubois has announced the appointment of Charles Kiesel of Raymond International and Edward Schecter of Stressteel Corporation as Co-Chairmen of the General Arrangements Committee for the PCI's Sixth Annual Convention in New York City, Sept. 27-29, 1960. Other members of the Committee will be M. F. Fornerod and Myers Van Buren, both of Raymond International.

President Dubois suggests that correspondence relating to the convention should be addressed to Charles Kiesel, in care of Raymond International, Inc., 140 Cedar Street, New York 6, N. Y.

Phillips Drill Co. Now Member of PCI

Phillips Drill Co., of Michigan City, Ind., manufacturer of the Red Head self-drilling concrete anchor, is among the new associate members of PCI. According to R. E. Dieterich, president of the Phillips Co., the Red Head self-drilling concrete anchoring system reduces costs and cuts installation time. The device is described by Mr. Dieterich as a fast-cutting, self-cleaning hollow core drill that chews its own hole in the hardest concrete and then becomes a permanent threaded anchor for a bolt. The Phillips company maintains branch es staffed by factory-trained field engineers in principal cities. Descriptive literature may be obtained by writing Phillips Drill Co., U. S. Highway 12 and Liberty Trail, Michigan City, Ind.

Prestressing Played Up At Convention of ASCE

Problems relating to various applications of prestressed concrete will occupy an important place on the convention program of the American Society of Civil Engineers in New Orleans March 7 to 11. Much of the program is being cosponsored with ASCE by the Prestressed Concrete Institute and the American Concrete Institute.

PCI members in cooperation with members of the ASCE will present papers dealing with research and development in various of prestressed concrete on programs of both the Construction and Structural divisions.

A well-balanced program on experimental research will be offered by the Structural division on Tuesday, March 8. Prof. Chester P. Siess and Prof. Mete A. Sozen of the University of Illinois will present a paper on shear, ultimate strength and deflection of prestressed concrete. Hubert Woods of the Portland Cement Association, will talk on fire research and Alan Matlock and Paul H. Kaar, both of the PCA laboratories, will deliver a paper on composite construction in bridges. A paper on shrinkage and creep in prestressed concrete will be offered by two U. S., Navy engineers, Robert A. Breckenridge and Sterling L. Bugg.

The Construction division is offering a broad program on prestressed concrete for bridges. Speakers will include William E. Dean, Jr., on prestressed concrete piling; Randall M. Dubois on design and construction of the Champaign, N. Y. bridge; Eric C. Molke on the Oneida Lake bridge. Morris Schupack will discuss the economics of cast-in-place bridges more than 100 ft. long.

Prof. O. Zienkiewicz of Northwestern University, will deliver a paper on prestressing in dams. G. M. Magee and F. P. Drew of the Association of American Railways will discuss prestressed railway ties. Richard Fountain and Alfred Parme of PCA will report the findings of a condition survey of prestressed concrete bridges in various locations under different types of service.