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Project 288: large bolted connections. Project summary report

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Project 288

LARGE BOLTED CONNECTIONS

Project Summary Report

by

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PROJECT SUMMARY

1. RECORDS

1.1 Data Books - The basic data from all tests conducted to date is filed in loose-leaf notebooks ($8\frac{1}{2}$" x 11") and can be found in room 403. For the most part, this data consists of the test results of Series E, F, J and K joints and associated material calibration, and the torqued tension, direct tension and shear behavior of high strength steel bolts.

The data books containing calculations and rough drafts pertaining to R. J. Christopher and J. J. Wallaert's masters' theses are retained with G. H. Sterling and are later to be reorganized and retired to the X-files.

1.2 Record File - In addition to the test data, various other records were necessary during the course of the project. Such things as mill reports, time sheets, record of costs, extra data sheets, etc. are stored in the Project filing cabinet in room 403. Also to be found in this filing cabinet are the shop drawings, drafted by the Bethlehem Steel Co. and the U. S. Steel Corp., of all the large bolted test joints.

1.3 Sketch Book - In the filing cabinet in room 403 is a file containing all the working sketches of test specimens, fixtures and equipment which have been prepared by members of Project 288. These sketches have been drawn on tracing paper and may be easily reproduced.

1.4 Literature on Bolted and Riveted Connections - A considerable volume of printed matter on bolted and riveted connections has been assembled from various literature searches. Much of this has been retained in project files and is stored in the filing cabinet in room 403. Part of this file is a complete set of Large Bolted Joints monthly progress reports. An index and a sign out sheet are placed at the front of the file.

At the present time, a bibliography is being prepared which presents references to all English language literature on bolted and riveted joints dating from 1944 to the present. Thus far, abstracts from 240 papers have been prepared.

1.5 Record of Tests Conducted - A record is kept of every test conducted including the type of test, testing machines used, personnel involved, date of test, the location of tested specimens, and any pertinent remarks. This record is currently being kept by Mr. Gordon Sterling.

2. INVENTORY OF SPECIMENS AND EQUIPMENT

2.1 Material Inventory - An inventory of project 288 material, complete to May, 1964, is kept in the office of Gordon Sterling. This is a perpetual inventory and should be revised as material is used. Most of the material is stored either on the 6th floor balcony, or in the 1st floor cabinet located on the south wall of the south bay of the test floor.

The two keys to the cabinet and one key to the 6th floor balcony are kept in room 403.

2.2 Scrap List - The large bolted joints of the E-Series tests were cut up and scrapped in April.

Fifteen barrels of A325 bolts that were used in past tests are located against the east wall at the main bay on the first floor. Many of these barrels contain broken bolts and it is recommended that these be scrapped. However, it is recommended that the untested bolts be kept, since they have found general use around the laboratory.

It is recommended that the tension shear jigs, located near the 1st floor cabinet, be dismantled and stored in the north bay. The A440 and Q & T steel could then be re-used for compression jigs.

3. PROJECT STATUS

Pages 1 and 2 of report 288.16 show tables containing a summary of Project 288 work that has been completed or is in progress as of March, 1964. In these tables, a phase number and an appropriate description of the phase is given. The number of tests performed and to be completed is also reported, together with an inventory of additional material on hand.

Page 3 summarizes the project phases which are now complete, phases now active, phases not initiated, and also phases which have yet to be formulated.

4. REPORTS

4.1 Status - A summary of Project 288 reports complete to March, 1964 is given on pages 4 and 5 of Report 288.16. A copy of each of these reports is available for reference in Room 403.

4.2 Extra Reports - The following extra copies of Fritz Lab. Reports are available; a) 4 copies of Fritz Lab. Report 288.1, b) 5 copies of Fritz Lab. Report 288.2, c) 8 copies of Fritz Lab. Report 288.4, d) 28 copies of Fritz Lab. Report 288.5. In addition, extra copies of John Fisher's doctoral dissertation, Fritz Lab. Report 288.10 are available.

4.3 Tracings of Figures - The original ink tracings of all report figures are stored in the file in room 403. An index to these tracings is stored in the record file.

4.4 Multilith Masters - All project reports were reproduced by the multilith process and the masters were preserved for future use. In the past, it has been the practice to reuse the old masters when reproducing a second time. However, this does not result in a very clear copy, so it is recommended that the Ektolith Process of duplication be used when copies are wanted a second time.

5. PHOTOGRAPHY

5.1 Photo Books - Prints of all photographs are mounted in data books 1 and 2. An index to the photographs is filed in the front of each photo book and lists the photo description and the project photo number. Additional photographic material, such as duplicates, are handled by G. H. Sterling

Each photograph has been assigned a negative number in order to facilitate ordering of additional prints. These numbers are placed beneath each photograph in the photo book.

5.2 Slides - Colored slides of many of the photographs are available. These slides are stored in data book number 3. An index of the slides is placed in the front of this notebook.

6. RECOMMENDATIONS FOR FUTURE WORK

The following items are areas in which more research is needed.

1. A new type of shear-inducing device is desirable. The present tension jig is expensive to fabricate and testing is difficult. The compression jig test results are not too reliable.

2. It would be desirable to torque bolts to very near failure and then apply a direct tension load.

3. A490 bolts should be tested in shear with the threads in the shear planes.

4. It is recommended that the relationship between bolt tension and nut rotation to be studied for prototype joints to determine the significance of tests conducted in a hyraulic bolt calibrator.

7. FUTURE ADDRESSES

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