

INVESTIGATIVE TESTING FOR RESOLUTION OF PETITIONERS' ALLEGATION,

SECTION III, ITEM 2, PAGE 12 (EXPANSION ANCHORS)

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1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that this is essential for the proper management of the organization's finances and for ensuring compliance with applicable laws and regulations.

2. The second part of the document outlines the specific procedures that must be followed when recording transactions. This includes the requirement that all entries be supported by appropriate documentation, such as invoices, receipts, and contracts.

3. The third part of the document addresses the issue of internal controls. It states that a robust system of internal controls is necessary to prevent and detect errors and fraud. This system should be designed to provide a reasonable assurance of the reliability of the financial information.

4. The fourth part of the document discusses the role of the audit function. It notes that the audit function is responsible for providing an independent and objective assessment of the organization's financial statements and internal controls. This assessment is crucial for the confidence of investors and other stakeholders.

5. The fifth part of the document concludes by reiterating the importance of transparency and accountability. It states that the organization is committed to providing clear and accurate information to all stakeholders and to holding all employees accountable for their actions.

SCOPE:

The purpose of this report is to document the testing conducted in response to petitioner's allegations of "sandbagging" Phillips expansion anchor holes in order to achieve minimum required torque values.

BACKGROUND:

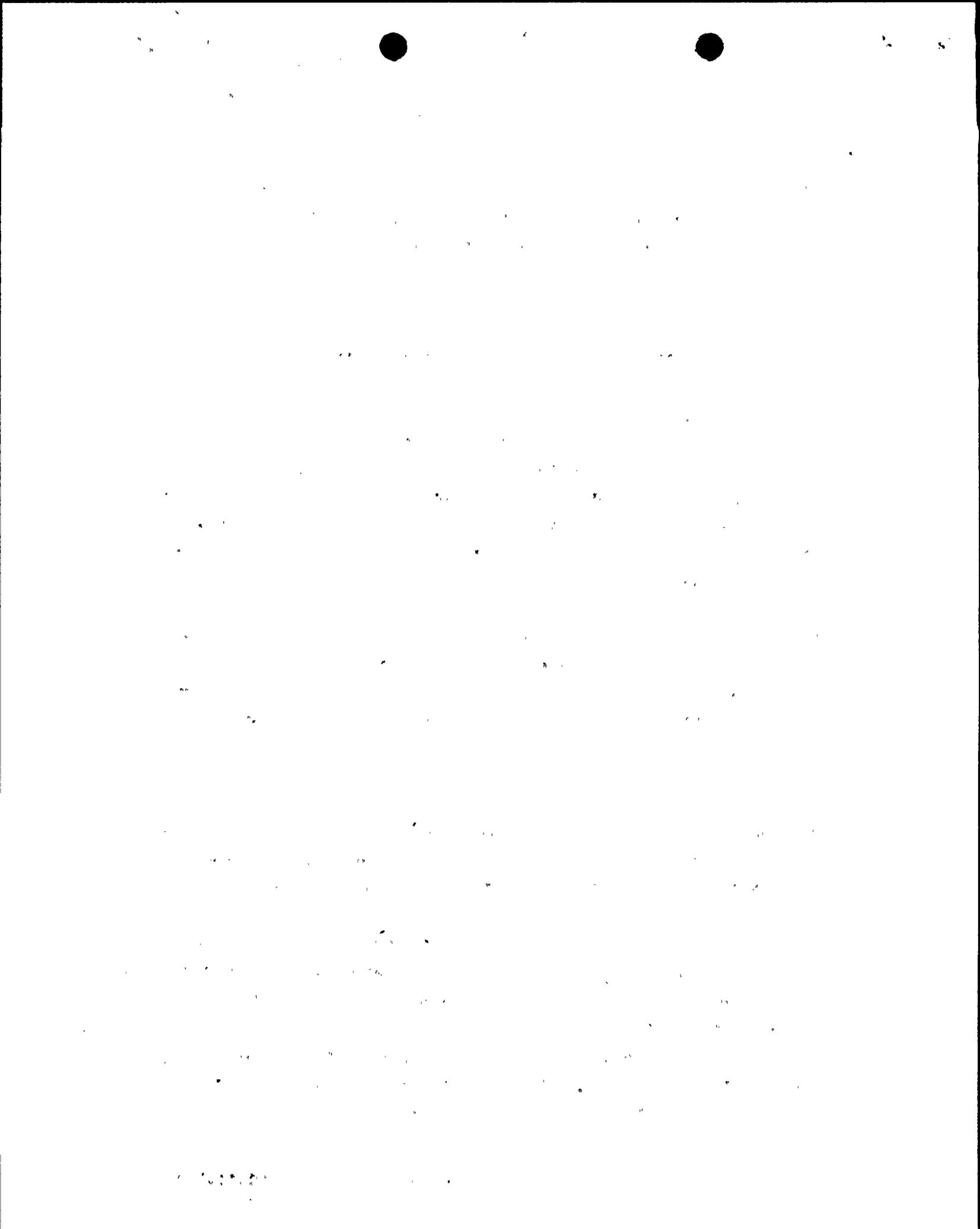
On October 17, 1986, petitioners CASH and Wells Eddleman alleged that the integrity of Phillips expansion anchors was compromised by "sandbagging". Specifically, the allegation states that on anchor placement numbers 1RA305003, 1RA305006, and 1RA305007 the expansion anchor holes were erroneously drilled oversize and fine sandblasting sand was poured into the anchor hole alongside the body of the anchor. The alleged purpose of this action was to cause the anchor to bind against the sandblasting sand and thus enable it to be torqued to the required minimum values.

The anchors in question are now no longer accessible for tension testing due to the proximity of electrical control cabinets. Therefore, the testing program outlined below was initiated to simulate the "sandbagging" conditions alleged and to subsequently tension test the anchors.

TEST PROCEDURE:

A review of the subject anchor placements revealed that the majority of the anchors installed were 3/4" diameter Phillips expansion anchors. Thus, 3/4" diameter anchors were chosen for the test sample.

The anchors were installed in the elevation 236' concrete slab just west of the intersection of N line and 44 line. Prior to anchor drilling, the area was scanned by the Radar Rebar Locator to determine the location of top mat rebar. The anchor holes were then drilled to avoid contact with the rebar. In addition, prior to drilling, the drill bits used were measured by a micrometer. The drill bits were again measured by a micrometer after the completion of drilling.



A total of nine anchor holes were drilled. Three of the holes were drilled in complete compliance with WP-33. The anchors were then installed through a 4" x 4" x 1/2" A-36 plate and properly torqued to the minimum required torque value of 150 ft-lbs. No sandblasting sand was added to these holes.

Another set of three holes was drilled in compliance with WP-33. The anchors were installed and then fine sandblasting sand was swept into the hole. The anchors were subsequently torqued through a 4" x 4" x 1/2" A-36 plate to the minimum required torque value of 150 ft-lbs.

The last set of three anchor holes was drilled and then purposely oversized. The anchor craftsman drilling the holes was instructed to "wallow" out the holes by placing lateral pressure on the drill bit during the drilling. Following the drilling, the anchors were placed in the holes and fine sandblasting sand was placed in the hole alongside the body of the anchor. Then the anchors were torqued through the 4" x 4" x 1/2" A-36 plate to the minimum required torque value of 150 ft-lbs.

The anchors were allowed to set undisturbed for a minimum of 24 hours in order for anchor relaxation to occur. Following the 24-hour relaxation period, the anchors were tension tested as prescribed in WP-33 and TP-39, Appendix A.

The anchors were tension tested by applying a tensile load on the anchors via a hydraulic ram and threaded rod couples that attached to the top threads above the nut on the expansion anchor. The ram was supported on a rigid stand. The ram hydraulic pressure was measured using a calibrated pressure gauge (gauge number CPL-5365B). Per Appendix A of TP-39, a 3/4" diameter anchor is considered to be acceptable if it can withstand a tension load of 5980 lbs. This equates to a hydraulic ram gauge pressure of 1265 psi (for 4000 psi concrete) using a hydraulic ram having an effective area of 4.725 in². See Figure 1 for a depiction of the entire tension testing assembly.



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A uniformly increasing load was applied to the expansion anchor via the hydraulic ram until the minimum tensile static test gauge pressure of 1265 psi was obtained. At this time the washer under the expansion anchor nut was tested to see if slip had occurred. Slip is defined as the point at which the washer can be rotated using only finger pressure. No slip occurred at the minimum tensile static test load on any of the nine anchors tested. The tensile load was then uniformly increased (with the concurrent test for anchor slip) until a maximum gauge pressure of 1600 psi was obtained. The slip gauge/pressure (if any) was recorded.

CONCLUSION:

This testing demonstrated that there was no loss of anchor performance as a result of oversizing the anchor holes or due to the inclusion of fine sandblasting sand into the anchor hole around the anchor. Three anchor holes were wallowed out by the use of vigorous lateral pressure on the drill bit combined with a circular motion of the drill motor. Sandblasting sand was then poured into the anchor hole. Another set of three anchors had properly sized holes and then fine sandblasting sand was poured into the anchor hole around the anchor. A third set of three anchors was properly drilled and installed without the inclusion of sandblasting sand.

The nine anchors installed tested to the minimum required gauge pressure of 1265 psi without slip. The anchors were tested as required in TP-39, Appendix A, for 3/4" diameter Phillips expansion anchors in 4000 psi design concrete. At the request of the NRC Resident Inspector, George Maxwell, the anchors were then further loaded until either slip or a gauge pressure of 1600 psi was attained.

Additional loading was not required and was performed strictly for the purposes of demonstrating the reserve factor of safety available. Results of the tests are shown in Table 1. In the three sets of bolts, one bolt in the "controlled" set slipped at 1400 psi, one in the "wallowed" set slipped at 1600 psi, and one in the "sand only" set



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slipped at 1500 psi. The remaining bolts experienced no slippage at 1600 psi. As noted, all of the bolts exceeded the required gauge pressure of 1265 psi before slip.

In conclusion, the test conditions simulated the conditions that allegedly exist as detailed in the intervenor allegation. No compromise in anchor quality resulted when the alleged anchor conditions were reproduced.

TABLE 1

TEST RESULTS

<u>ANCHOR I.D.</u>	<u>GAUGE PRESSURE (PSI)</u>	<u>REMARKS</u>
C1	1400	slip
C2	1600	no slip
C3	1600	no slip
W1	1600	no slip
W2	1600	slip
W3	1600	no slip
S1	1600	no slip
S2	1600	no slip
S3	1500	slip

NOTES:

C - Controlled - holes and anchors drilled and installed per WP-33.

W - Walled - holes were purposely oversized by poor drilling practice (i.e., wallowing out the hole). Sand was then poured in around the anchor body.

S - Sand Only - holes were properly drilled and then sand was poured in and around the anchor body.

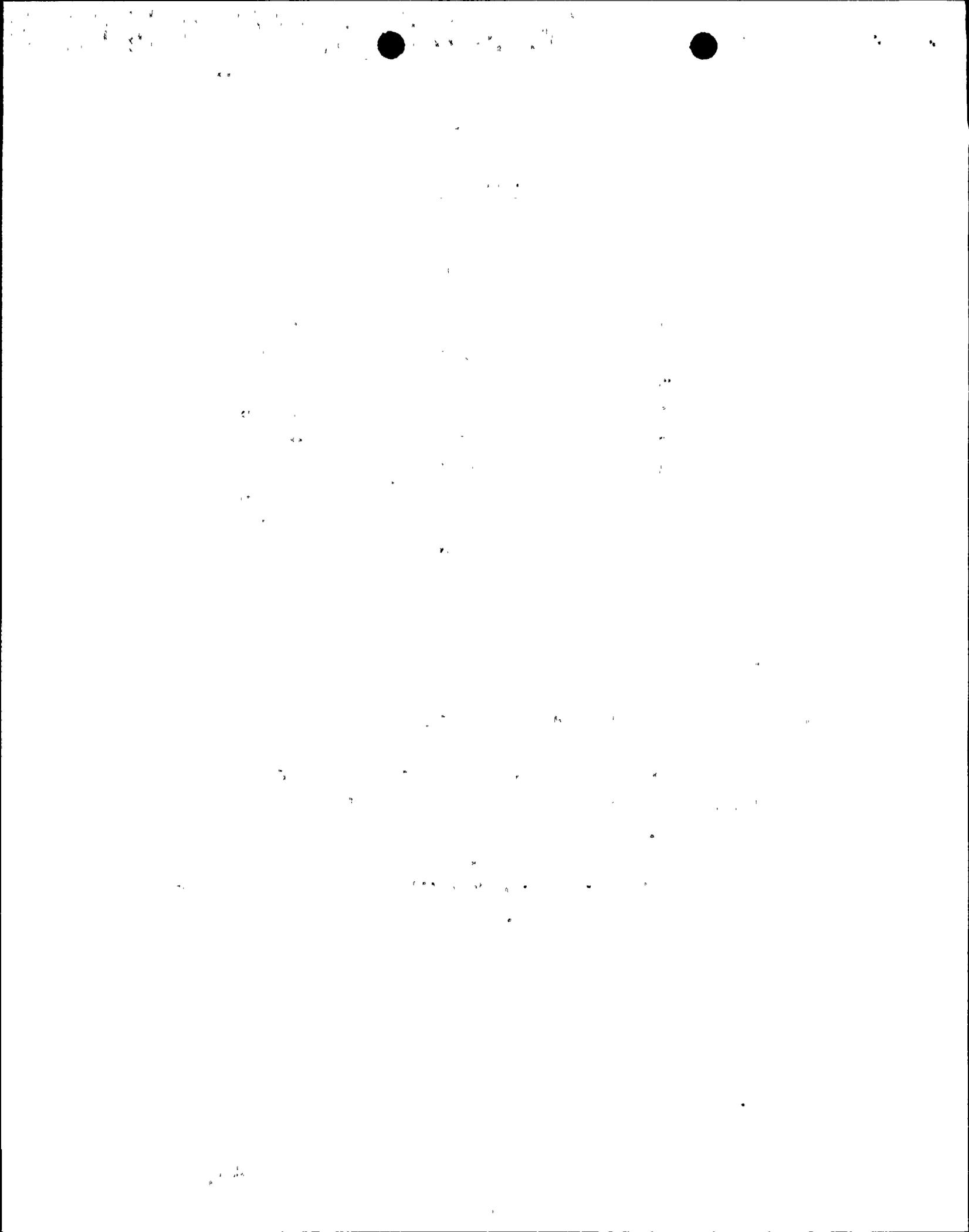
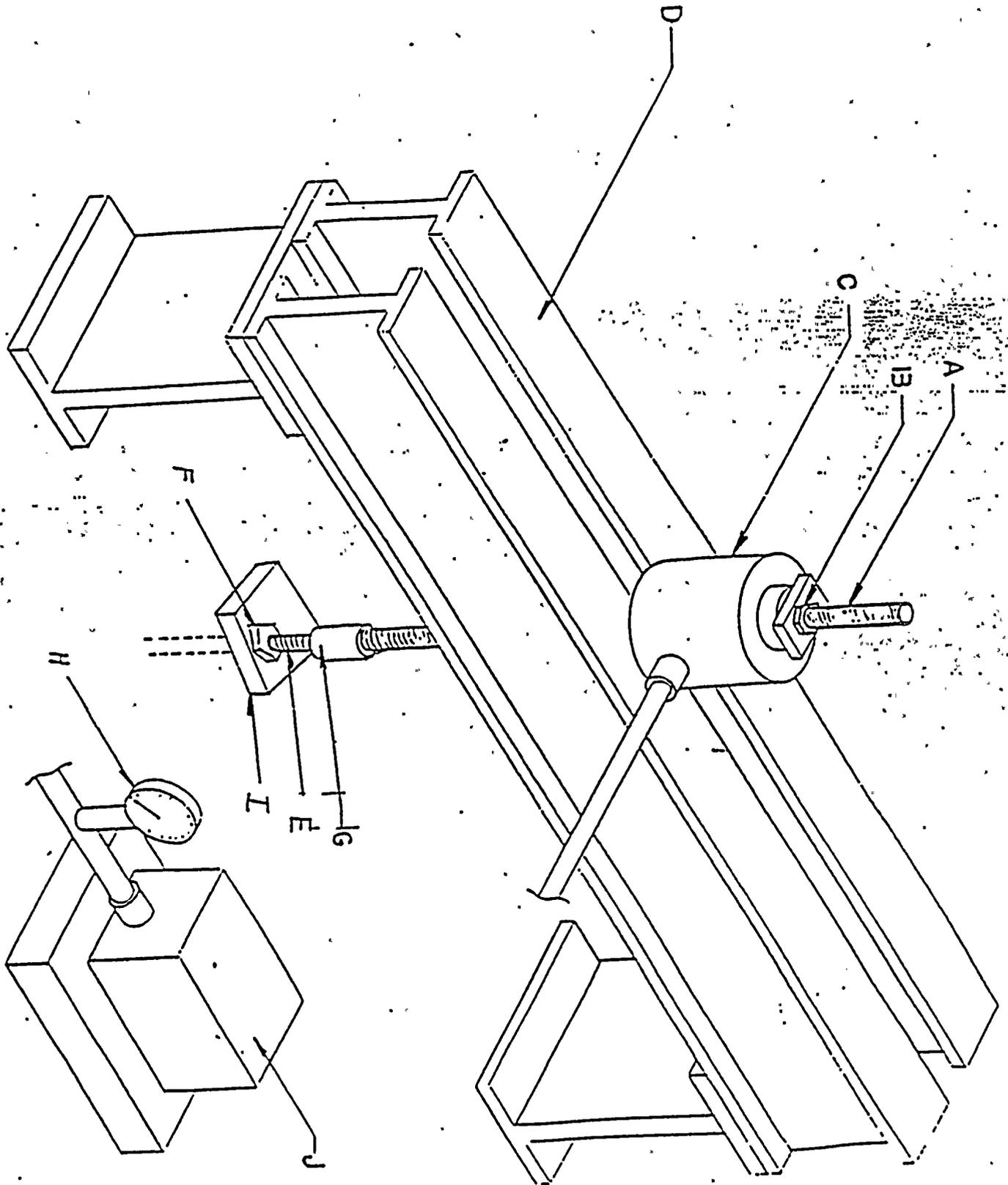


FIGURE 1





NOTES FOR FIGURE 1

- A. Threaded Tensioning Rod
- B. Tensioning Nut
- C. Hydraulic Ram (Area = 4.725 in^2)
- D. Rigid Support Stand
- E. Expansion Anchor
- F. Expansion Anchor Nut and Washer
- G. Internally Threaded Coupler
- H. Calibrated Pressure Gauge
- I. Bearing Base Plate
- J. Hydraulic Pump (Hand Operated)



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