SOUTH CAROLINA
DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
P.O. BOX 191
COLUMBIA, S.C. 29202

October 11, 1989

MEMORANDUM TO GROUP LEADERS

Subject: Seismic Requirements for Bridges

All bridges shall be detailed and/or designed for seismic loadings as specified for seismic performance category B (SPC B) in the 1983 AASHTO Guide Specifications for Seismic Design including subsequent revisions. The level of seismic considerations given to each structure shall be based on one of the following two categories.

1. Major Bridges
   All major coastal bridges and other major bridges as designated by the Bridge Design Engineer shall be designed and detailed for seismic loadings in accordance with the Guide Specifications. An acceleration coefficient of 0.15 shall be used for the design and analysis of these bridges.

2. Other Bridges
   All bridges not specified in Item 1. above to receive a seismic design shall be detailed in accordance with the minimum requirements set forth in the Guide Specifications. These minimum requirements include the following:

   A. Minimum Support Length
      The minimum support length requirements of Section 4.9.1 shall be provided.

   B. Special Pile Requirements
      The special pile requirements of Section 6.3.1(C) shall be provided.

      (1) Prestressed Concrete Piles
          The details shown on Bridge Design standard drawing number 712 are sufficient to meet these requirements.

(2) Steel H Piles
When steel piles are used in footings or caps, the pile shall be anchored in the footing by placing a reinforcing bar through a hole in the web of the pile similar to the detail shown in Figure 1 attached to this memorandum.

C. Footing Reinforcement
The anchorage of piles into footings will require tension reinforcement in the top of the footing to resist the potential negative bending. The minimum reinforcement in the top of the footing shall be #5 bars at 12" on center in both directions.

D. Transverse Column Reinforcement
The minimum transverse reinforcement for the top and bottom of columns as specified in Section 8.3 shall be provided. Transverse reinforcement for round columns shall be #4 ties with 135° seismic hooks as shown in Figure 2. The maximum spacing of #4 ties in the confinement length and the vertical extension as shown in Figure 4 is 4" for a 3'-0" diameter column. The spacing of ties between the areas of confinement at the top and bottom of columns will be 12" on center.

E. Cap Stirrups
All cap stirrups located between columns or piles shall be one piece enclosed hoops having 135° seismic hooks at one corner as shown in Figure 3.

F. Beam and Girder Anchorage
All beams and girders, including both steel and concrete, shall be positively anchored to the substructure on both ends by means of anchor bolts or dowels.

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cc:
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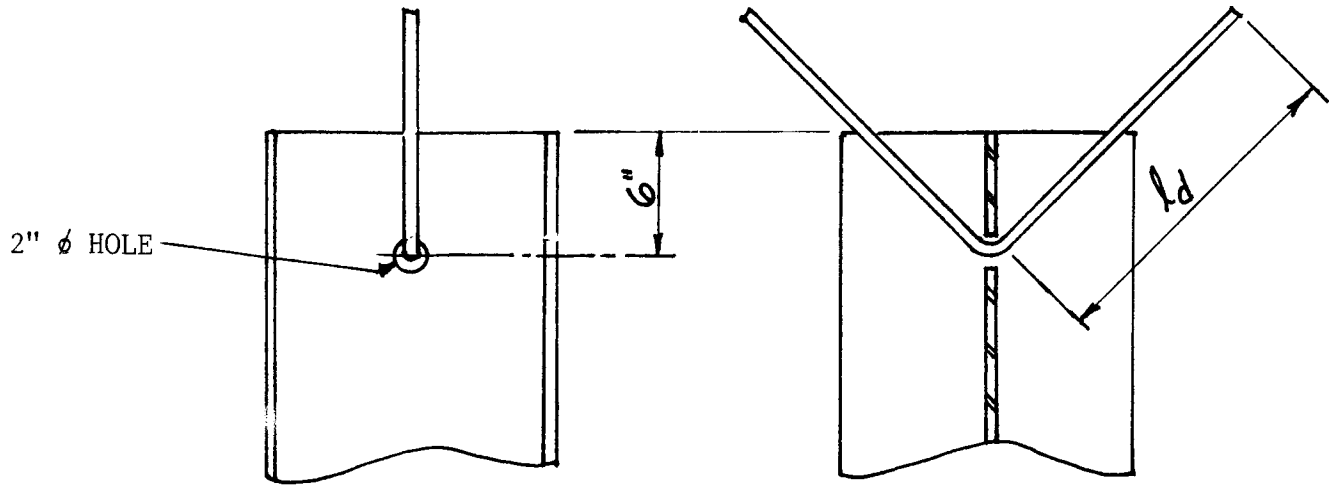

Note: Size reinforcing bar to carry in tension 10% of the Design Bearing of the pile.

FIGURE 1

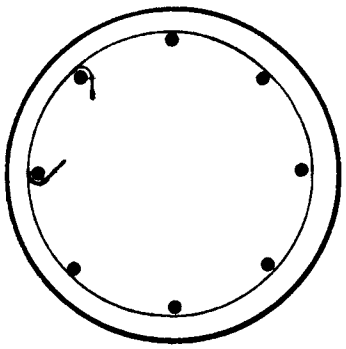

FIGURE 2

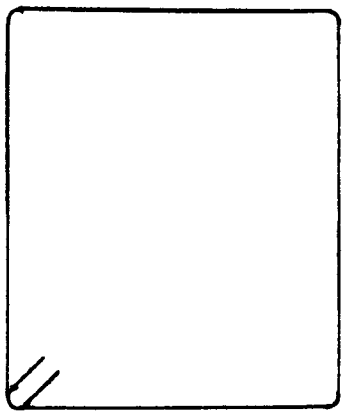

FIGURE 3

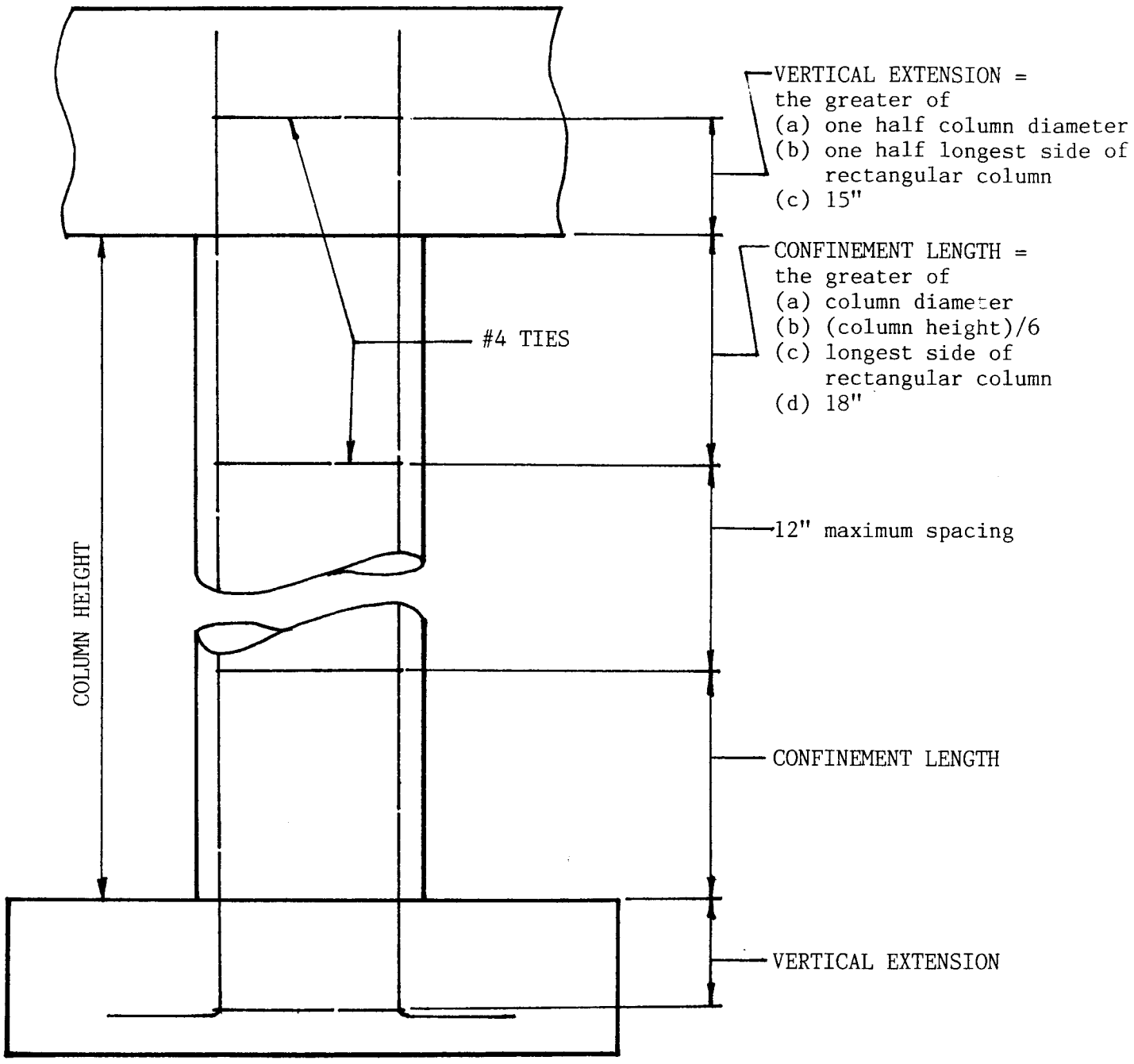
VERTICAL EXTENSION =
the greater of
(a) one half column diameter
(b) one half longest side of
rectangular column
(c) 15"
CONFINEMENT LENGTH =
the greater of
(a) column diameter
(b) (column height)/6
(c) longest side of
rectangular column
(d) 18"
#4 TIES
12" maximum spacing
COLUMN HEIGHT
CONFINEMENT LENGTH
VERTICAL EXTENSION

FIGURE 4