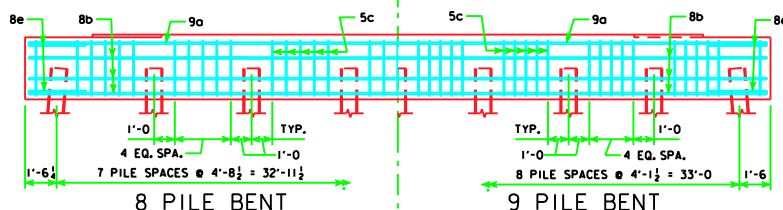


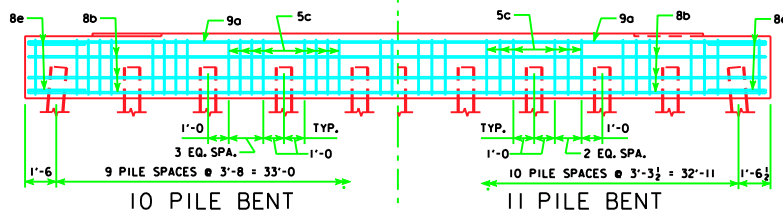
Diagram illustrating the layout of pile bents for a bridge pier, showing dimensions and labels:

- 6 PILE BENT:**
  - Left side dimension: 1'-6"
  - Center dimension: 5 PILE SPACES @ 6'-7" = 32'-11"
  - Right side dimension: 1'-6"
- 7 PILE BENT:**
  - Left side dimension: 1'-0"
  - Center dimension: 6 PILE SPACES @ 5'-6" = 33'-0"
  - Right side dimension: 1'-6"
- Labels and Notes:**
  - SYMMETRICAL ABOUT C PIER EXCEPT STEPS
  - GRADE ELEV. @ C PIER
  - 8e, 8b, 9a, 5c (Labels for specific pile sections)
  - 1'-0" (Typical spacing dimension)
  - 5 EQ. SPA. (5 Equal Spaces)
  - 4 EQ. SPA. (4 Equal Spaces)
  - TYP. (Typical)

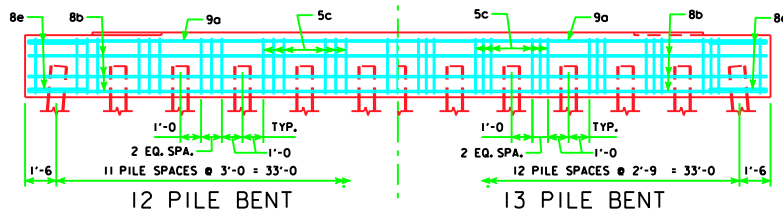
## 6 PILE BENT



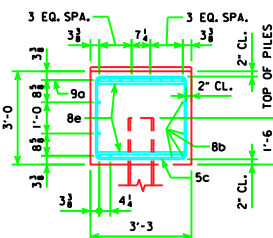
8 PILE BENT



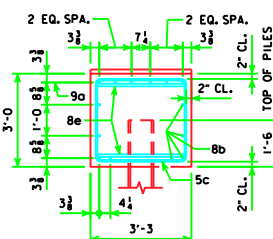
10 PILE BENT



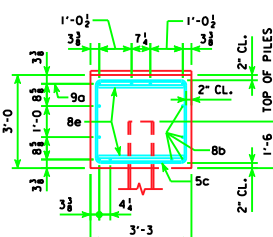
12 PILE BENT



VIEW A-A  
FOR 6 & 7 PILE BENTS



VIEW A-A  
FOR 8, 9 & 10 PILE BENTS



VIEW A-A  
FOR 11, 12 & 13 PILE BENTS

| BAR | SHAPE | 6 PILE BENT |               | 7 PILE BENT |               | 8 PILE BENT |               | 9 PILE BENT |               | 10 PILE BENT |               | 11 PILE BENT |               |    |        |     |
|-----|-------|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|--------------|---------------|--------------|---------------|----|--------|-----|
|     |       | NO.         | LENGTH/WEIGHT | NO.         | LENGTH/WEIGHT | NO.         | LENGTH/WEIGHT | NO.         | LENGTH/WEIGHT | NO.          | LENGTH/WEIGHT | NO.          | LENGTH/WEIGHT |    |        |     |
| 8b  |       | 8           | 35'-8"        | 970         | 8             | 35'-8"      | 970           | 6           | 35'-8"        | 728          | 6             | 35'-8"       | 728           | 4  | 35'-8" | 485 |
| 9b  |       | 8           | 35'-8"        | 762         | 8             | 35'-8"      | 762           | 8           | 35'-8"        | 762          | 8             | 35'-8"       | 762           | 8  | 35'-8" | 762 |
| 5c  |       | 32          | 12'-2"        | 406         | 32            | 12'-2"      | 406           | 37          | 12'-2"        | 470          | 42            | 12'-2"       | 533           | 38 | 12'-2" | 482 |
| 8c  |       | 4           | R'-4"         | 89          | 4             | R'-4"       | 89            | 4           | R'-4"         | 89           | 4             | R'-4"        | 89            | 4  | R'-4"  | 89  |

|   |                         |      |      |      |      |      |      |
|---|-------------------------|------|------|------|------|------|------|
| ④ | REINFORCING STEEL (LB.) | 2227 | 2227 | 2049 | 2112 | 2061 | 1742 |
|   | ② PILE TYPE             |      |      |      |      |      |      |
|   | STRUCTURAL              |      |      | 13.1 | 13.0 | 13.0 | 12.9 |
|   | CONCRETE (CY)           |      |      | 13.4 | 13.4 | 13.4 | 13.4 |

|     |       | 12 PILE BENT |        |        | 13 PILE BENT |        |        |  |  |
|-----|-------|--------------|--------|--------|--------------|--------|--------|--|--|
| BAR | SHAPE | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT |  |  |
| 9a  |       | 4            | 35'-8" | 485    | 4            | 35'-8" | 485    |  |  |
| 9b  |       | 8            | 35'-8" | 762    | 8            | 35'-8" | 762    |  |  |

BENT BAR DETAILS

The diagram illustrates the bent bar details for a bent pile. It shows two cross-sections of the pile. The first cross-section shows a square pile with a side length of 6 feet. The second cross-section shows a rectangular pile with a width of 6 feet and a height of 2 feet 9 inches. The bent bars are shown as lines within the pile sections, with dimensions indicating their placement and length.

Diagram showing two rectangles, 5c and 8e, with their dimensions and areas.

Rectangle 5c has dimensions 6 by 2'-11 and area  $D=2\frac{1}{2}$ .

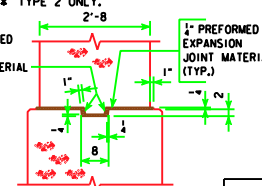
Rectangle 8e has dimensions 6 by 2'-9 and area  $D=6$ .

NOTE: ALL DIMENSIONS ARE  
OUT TO OUT. D=PIN DIAMETER.

| 6-8 TON<br>CUMULATIVE<br>BEARING | FRICTION BEARING PILING                    |                   |                                     |                                         | FRICTION OR POINT BEARING PILING           |                   |                                     |                                         |
|----------------------------------|--------------------------------------------|-------------------|-------------------------------------|-----------------------------------------|--------------------------------------------|-------------------|-------------------------------------|-----------------------------------------|
|                                  | PIOA TYPE 1 OR 2                           |                   |                                     |                                         | PIOA TYPE 3                                |                   |                                     |                                         |
|                                  | NUMBER OF<br>TRESTDLE PILES<br>AND SPACING | ① "K"<br>(INCHES) | DES. PILE<br>BRG.(TONS)<br>W/IMPACT | DES. PILE ③<br>BRG.(TONS)<br>W/O IMPACT | NUMBER OF<br>TRESTDLE PILES<br>AND SPACING | ① "K"<br>(INCHES) | DES. PILE<br>BRG.(TONS)<br>W/IMPACT | DES. PILE ③<br>BRG.(TONS)<br>W/O IMPACT |
| 138'-10"                         | 10 PILES @ 3'-8" CTRS.                     | 14                | 28                                  | 26                                      | 6 PILES @ 6'-7" CTRS.                      | 16                | 47                                  | 43                                      |
|                                  | 8 PILES @ 4'-8" CTRS.                      | 16                | 35                                  | 32                                      | 7 PILES @ 5'-6" CTRS.                      | 18                | 40                                  | 37                                      |
| 151'-4"                          | 10 PILES @ 3'-8" CTRS.                     | 14                | 30                                  | 27                                      | 6 PILES @ 6'-7" CTRS.                      | 16                | 49                                  | 45                                      |
|                                  | 9 PILES @ 4'-1" CTRS.                      | 16                | 33                                  | 30                                      | 7 PILES @ 5'-6" CTRS.                      | 18                | 42                                  | 39                                      |
| 163'-10"                         | 11 PILES @ 3'-3" CTRS.                     | 14                | 29                                  | 27                                      | 7 PILES @ 5'-6" CTRS.                      | 16                | 46                                  | 42                                      |
|                                  | 9 PILES @ 4'-1" CTRS.                      | 16                | 36                                  | 33                                      | 7 PILES @ 5'-6" CTRS.                      | 18                | 46                                  | 42                                      |
| 176'-4"                          | 12 PILES @ 3'-0" CTRS.                     | 14                | 28                                  | 26                                      | 7 PILES @ 5'-6" CTRS.                      | 16                | 48                                  | 44                                      |
|                                  | 10 PILES @ 3'-8" CTRS.                     | 16                | 34                                  | 31                                      | 8 PILES @ 4'-8" CTRS.                      | 18                | 42                                  | 39                                      |
| 188'-10"                         | 12 PILES @ 3'-0" CTRS.                     | 14                | 29                                  | 27                                      | 7 PILES @ 5'-6" CTRS.                      | 16                | 50                                  | 47                                      |
|                                  | 10 PILES @ 3'-8" CTRS.                     | 16                | 35                                  | 33                                      | 8 PILES @ 4'-8" CTRS.                      | 18                | 44                                  | 41                                      |
| 201'-4"                          | #12 PILES @ 3'-0" CTRS.                    | 14                | 33                                  | 31                                      | 8 PILES @ 4'-8" CTRS.                      | 16                | 50                                  | 46                                      |
|                                  | 11 PILES @ 3'-3" CTRS.                     | 16                | 36                                  | 34                                      | 8 PILES @ 4'-1" CTRS.                      | 18                | 44                                  | 41                                      |
| 213'-10"                         | 12 PILES @ 2'-9" CTRS.                     | 14                | 32                                  | 30                                      | 9 PILES @ 4'-1" CTRS.                      | 16                | 46                                  | 43                                      |
|                                  | 12 PILES @ 3'-0" CTRS.                     | 16                | 35                                  | 33                                      | 9 PILES @ 4'-1" CTRS.                      | 18                | 46                                  | 43                                      |
| 226'-4"                          | #13 PILES @ 2'-9" CTRS.                    | 14                | 33                                  | 31                                      | 9 PILES @ 4'-1" CTRS.                      | 16                | 48                                  | 45                                      |
|                                  | 12 PILES @ 3'-0" CTRS.                     | 16                | 36                                  | 34                                      | 10 PILES @ 3'-8" CTRS.                     | 18                | 43                                  | 41                                      |
| 243'-0"                          | 13 PILES @ 2'-9" CTRS.                     | 16                | 35                                  | 33                                      | 9 PILES @ 4'-1" CTRS.                      | 16                | 50                                  | 47                                      |
|                                  |                                            |                   |                                     |                                         | 10 PILES @ 3'-8" CTRS.                     | 18                | 45                                  | 42                                      |

- ① SEE STANDARD P10A FOR "K" DIMENSION.
  - ② CONCRETE QUANTITIES SHOWN HAVE HAD THE VOLUME OF EMBEDDED PILES DEDUCTED FOR TYPES 1 AND 2 BASED ON 0.8 FT<sup>3</sup> PER FOOT OF EMBEDMENT. THE CONCRETE QUANTITIES FOR TYPE 3 PILES DO NOT REQUIRE REDUCTION FOR PILE EMBEDMENT.
  - ③ FOR ESTIMATING PILE LENGTHS AND FOR DETERMINING ACTUAL PILE LENGTHS IN FIELD.
  - ④ SEE SHEET H24-31-06 FOR STEP REINFORCING STEEL QUANTITY AND DETAILS.
- \* TYPE 2 ONLY.

THESE PIER BENTS ARE DESIGNED FOR USE WITH STANDARD H24-6 PRESTRESSED PRESTRESSED CONCRETE BEAM BRIDGES IN LOCATIONS WHERE ICE AND DRIFT CONDITIONS ARE NOT SEVERE. PIER PILES ARE TO BE DRIVEN TO THE DESIGN BEARING VALUE W/O IMPACT. FOR DETAILS OF TRESTLE PILES, TYPES 1, 2 AND 3, SEE STANDARD P10-A. DETAILS SHOWN FOR CONCRETE PILES. FOR ORIENTATION OF STEEL PILES, SEE STANDARD P10-B. MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.



KEYED NOTCH  
DETAIL

|                                                            |                                                                                                                                             |                                                  |                   |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------------|
| LATEST REVISION DATE                                       |  Iowa Department of Transportation<br>Highway Division |                                                  |                   |
|                                                            |                                                                                                                                             | STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE |                   |
|                                                            |                                                                                                                                             | PRETENSIONED PRESTRESSED                         |                   |
|                                                            |                                                                                                                                             | CONCRETE BEAM BRIDGES                            |                   |
| APPROVED BY BRIDGE ENGINEER<br><i>Steven L. M. Dunsell</i> | HL93 SUPERSTRUCTURE                                                                                                                         | DECEMBER, 2006                                   | HS25 SUBSTRUCTURE |
|                                                            | PILE BENT DETAILS<br>45° SKEW                                                                                                               |                                                  | H24-45-06         |