



PRESTRESSED CONCRETE BENT CAPS

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Conventionally Reinforced, Precast Bent Caps

- Better concrete quality
- Faster construction



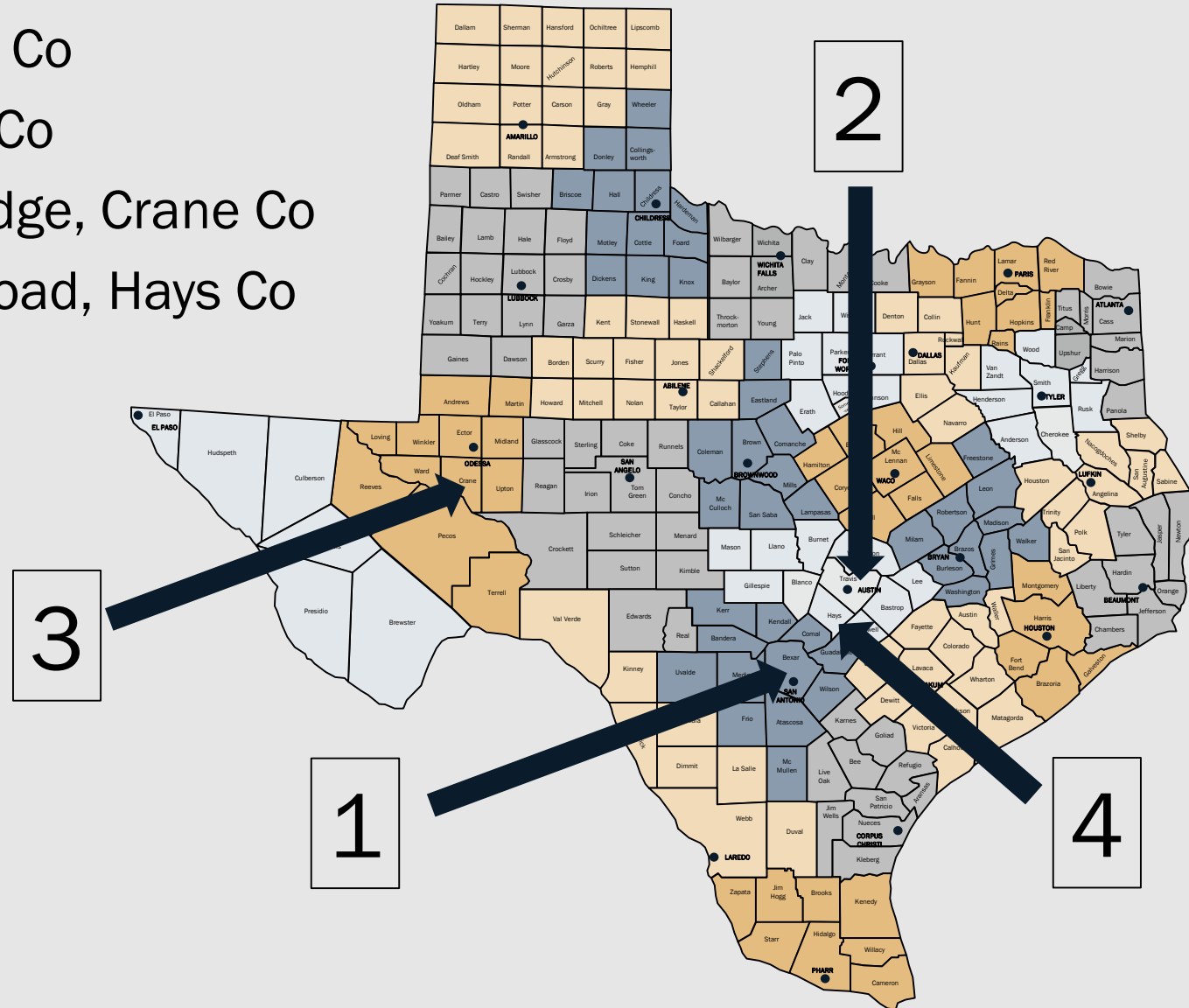
Prestressed, Precast Bent Caps

- Same advantages as conventionally reinforced, precast caps
- Prestressing provides enhanced crack control



Completed Projects

1. LP 1604, Bexar Co
2. FM 973, Travis Co
3. Pecos River Bridge, Crane Co
4. Fischer Store Road, Hays Co



LP 1604 Bexar County, San Antonio, TX

- 36 Bents Total (18 NB, 18 SB)
- Identical Length and Column Spacing



FM 973 over Colorado River, Travis Co

- 8 Bents Total (4 NB, 4 SB)
- Accelerated Construction Timeline



Pecos River Bridge

- Remote site location:
 - No concrete batch plants nearby
 - Precast a number of different concrete members, including:
 - Prestressed Abutments and Precast Approach Slabs



Fischer Store Road

- Original Bridge washed out from major flood event



Fischer Store Road

- Emergency Replacement Project w/ Short Construction Timeline



Fischer Store Road

- Demolition/New Construction complete in approximately 80 days



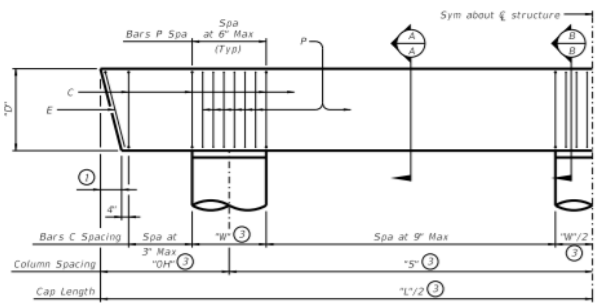
Prestressed, Precast Bent Cap Standard

- Released April 2017
- Intended as an alternate for standard bridge interior bent standards
- Include standard in plan sets using standard designed interior bents supported on round columns
- Applies to bridges with following beam types:
 - TxGirders
 - X-Beams
 - Box Beams
 - Decked Slab Beams
 - Slab Beams
- No adjustments to quantities required
- No Special Specifications

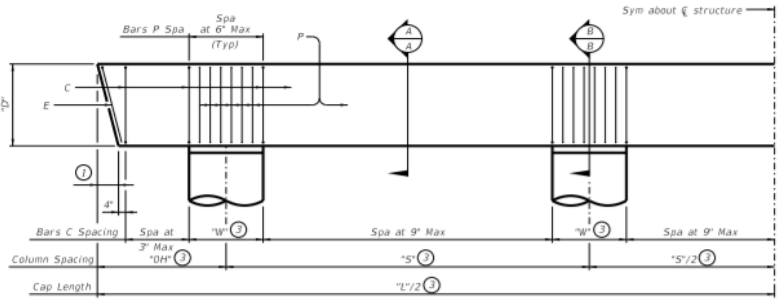
Prestressed, Precast Bent Cap Standard

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind, express or implied, is made by the Texas Department of Transportation or the American Concrete Institute of this standard or for incorrect results or damages resulting from its use.

DATE: FILE:



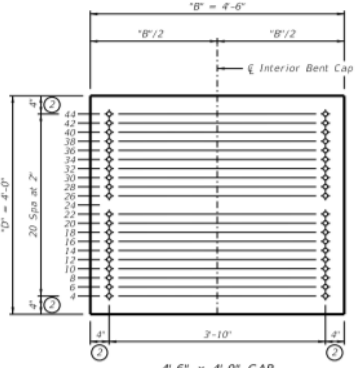
SHOWING 3 COLUMN BENT



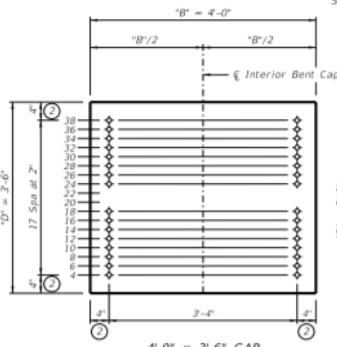
SHOWING 4 COLUMN BENT

INTERIOR BENT HALF ELEVATION

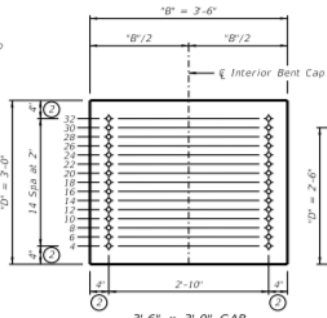
Strands not shown for clarity.



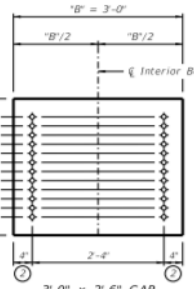
4-6' x 4-0' CAP
Used with I-girders (Tx62)



4-0' x 3-6' CAP
Used with I-girders (Tx28-Tx54) and X-Beams



3-6' x 3-0' CAP
Used with Decked Slab Beams and X-Beams

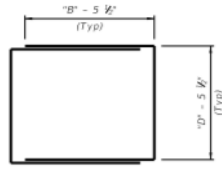


3-0' x 2-6' CAP
Used with Slab Beams

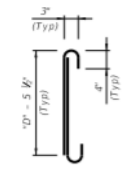
INTERIOR BENT SECTIONS

(Showing strands only)

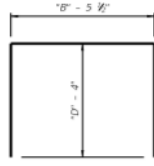
| SUPERSTRUCTURE TYPE | DESIGNED CAPS | | | | OPTIONAL DESIGN | | | | | |
|-----------------------|----------------|----------------|---------------------------------|-------------------------|------------------------------|----------------------|----------------------|--|-------|-----------|
| | CAP DIMENSIONS | | | CONCRETE | PRESTRESSING STRANDS | | | REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH 1) | | |
| | CAP WIDTH | CAP DEPTH | CORRUGATED PIPE INSIDE DIAMETER | RELEASE STRENGTH | MINIMUM 28 DAY COMP STRENGTH | LAYERS OF PS STRANDS | TOTAL NO. PS STRANDS | | SIZE | STRENGTH |
| Slab Beams | "B" (ft-in) | "D" (ft-in) | (ft-in) | f _r (ksi) | f _c (ksi) | | | (in) | (ksi) | (ft-kips) |
| Decked Slab Beams | 3-6" | 3-0" | 2-0" | 4.0 | 5.0 | 12 | 24 | 0.6 | 270 | 1,201 |
| Box Beams | 3-6" | 3-0" | 2-0" | 4.0 | 5.0 | 15 | 30 | 0.6 | 270 | 1,886 |
| X-Beams | 4-0" | 3-6" | 2-6" | 5.2 | 6.5 | 16 | 32 | 0.6 | 270 | 2,671 |
| I-Girders (Tx28-Tx54) | 4-0" | 3-6" | 2-6" | 4.0 | 5.0 | 16 | 32 | 0.6 | 270 | 2,484 |
| I-Girders (Tx62) | 4-6" | 4-0" | 3-0" | 4.0 | 5.0 | 20 | 40 | 0.6 | 270 | 3,634 |



BARS C (#5)
Showing one complete bar.

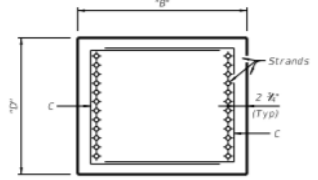


BARS P (#3)
Showing one complete bar.

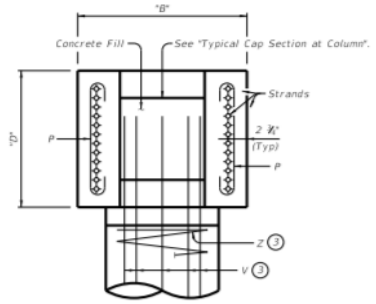


BARS E (#5)

- ① Variable. See Interior Bents sheet for dimension. When dimension is 0', omit bars E and reduce end cover to bars C to 3". Measured parallel to top of cap cross-slope.
- ② Dimensioned to center of strand.
- ③ See Interior Bents sheet.



SECTION A-A



SECTION B-B

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation Bridge Division Standard

PRESTRESSED, PRECAST BENT CAP OPTION FOR ROUND COLUMNS

PPBC-RC

| | | | | |
|----------------------|-------------|-------------|-------------|-------------|
| FILE: ppbc001-17.dwg | REV: CPW | DATE: ALP | REV: JTB | DATE: CPW |
| PROJECT: April 2017 | CONF: SECT | JOB | ISSUE: 1 | ISSUE: 1 |
| REV: 0000 | DATE: 00/00 | DATE: 00/00 | DATE: 00/00 | DATE: 00/00 |
| DATE: 00/00 | DATE: 00/00 | DATE: 00/00 | DATE: 00/00 | DATE: 00/00 |

Ongoing Research: 0-6863

- Full scale tests analyzing performance at varying service and strength load levels



- Implementation of research project 0-6863 findings
- Update Standards
 - Refinement of reinforcing details
 - Addition of voids to reduce shipping weight
 - Revised connection details for easier constructability
- Increase awareness and use of prestressed, precast standards across the state

Acknowledgements

- Fabricator:
 - Bexar Concrete Works

- Contractor:
 - Texas Sterling Construction Co. – LP 1604
 - Lane Construction – FM 973
 - Relmco Inc.- Pecos River Bridge
 - Dan Williams Co – Fischer Store Rd

- Research Team
 - Texas A&M and TTI

Questions?

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