**STATIC CANTILEVER**

1. The maximum sign panel overlap onto flange shall not exceed 6" - 0" from the field splice.
2. When several sign panels are to be installed with a space between the panels, the space shall be as small as possible and not greater than 2" - 0" maximum without safety cables.
3. All posts between base plate and field splice shall have a base wall thickness of 1/2". All mast arms shall have a base wall thickness of 1/4".
4. During sign erection, the post shall be aligned by using the leveling nuts to make the sign panel level.
5. Field splice details are for both cantilever signs and sign bridges. See Sheet B for additional field splice information.

**DYNAMIC CANTILEVER**

1. The maximum cantilever overlap onto flange shall not exceed 6" - 0" from the field splice.
2. All posts between base plate and field splice shall have a tube wall thickness of 1/2". All mast arms shall have a tube wall thickness of 1/4".
3. During sign erection, the post shall be aligned by using the leveling nuts to make the sign panel level.
4. Field splice details are for both cantilever signs and sign bridges. See Sheet B for additional field splice information.

**PIPE POST**

<table>
<thead>
<tr>
<th>Size (in)</th>
<th>Dia. (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.75</td>
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</tr>
<tr>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>18</td>
<td>8</td>
</tr>
<tr>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>24</td>
<td>8</td>
</tr>
</tbody>
</table>
NOTES

1. THE MAXIMUM SIGN PANEL OVERLAP ENDS ELUION SHALL NOT EXCEED 1/2"-0" FROM THE FIELD SPLICE.
2. WHEN SEVERAL SIGN PANELS ARE TO BE INSTALLED WITH A SPACE, BETWEEN THE PANELS, THE SPACE SHALL BE AS SMALL AS POSSIBLE AND 2'-0" MAXIMUM WITHOUT SAFETY CABLES.
3. ALL POSTS BETWEEN GASS PLATE AND FIELD SPLICE SHALL HAVE A TUBE WALL THICKNESS OF 3/8". ALL MAST ARMS SHALL HAVE A TUBE WALL THICKNESS OF 7/16".
4. BEFORE ANY PORTION OF THE SIGN FRAME ASSEMBLES IN THEIR FINAL POSITIONS THE CONTRACTOR SHALL DEXAMINATE THE FRAMES TO THE ENGINEER BY A TECHNICIAN QUALIFIED TO PERFORM THE REPAIRS, INSPECTION. THE TECHNOLOGIST SHALL INSPECT THE FIELD length OF SPANS AND THE SPANS LENGTH BETWEEN CROSSFRAMES. A MAXIMUM FIELD MEASURED SPAN LENGTH BETWEEN CROSSFRAMES.
5. IF THE SIGN FRAMES ARE ERECTED AS ONE UNIT, THEY SHALL BE ADEQUATELY SUSPENDED TO AVOID DISORDERS OR CHANGES IN SPAN LENGTH BETWEEN BASE PLATES.
6. FOR MAST ARMS WITH LENGTHS BETWEEN 45'-0" AND 80'-0" A BOLTED FIELD SPLICE WILL BE PERMITTED AT 4'-0" OF THE ARM TO Facilitate SAUCERNING AND MAINTENANCE OPERATIONS. FOR MAST ARMS WITH LENGTHS GREATER THAN 80'-0", TWO BOLTED FIELD SPLICE WILL BE PERMITTED AT THE 4'-0" POINJS TO FACILITATE MAINTENANCE AND MAINTENANCE OPERATIONS.
7. SEE SHEET 2 FOR FIELD SPLICE DETAILS.
**MISCELLANEOUS WALKWAY DETAILS**

**SAFETY RAILING ELEVATION**

**BETWEEN PANELS**

**SAFETY CABLE ELEVATION**

**PLAN - KICKER BAR**

**CHAIN ASSEMBLY**

**DETAIL**

**NOTES**

1. Special care shall be taken to ensure that the complete hinge and fastener assembly will hold the safety railing in a stable, manner, free of wobble while in the raised position. Maximum allowable displacement from vertical at top of railing when latched shall be 1".

2. Details for bolting hinge base plate to walkway bracket may be submitted for approval.

3. Safety chain shall be ²" galvanized steel, galvanized, approximately 56 links per yard. Length shall be minimum which allows lock-up of safety railing.

**MONOTUBE OVERHEAD SIGNS**

Issued By: Traffic Engineering Unit July 4, 2006

STANDARD PLAN NO. S-614-50

Sheet No. 10 of 14
MONOTUBE OVERHEAD SIGNS

STANDARD PLAN NO.

S-614-50

Sheet No. 11 of 14
TYPICAL VERTICAL POST CANTILEVER

PIPE SELECTION PROCEDURE FOR VERTICAL POST CANTILEVERS

A. COVERAGE PERCENTAGE = SIGN PANEL LENGTH / SPAN
   FOR THE SPAN LENGTH USE THE SPAN FROM ONE END OF THE CHART TO 20', 50', OR 65', NOT THE ACTUAL SPAN.

B. PICK THE PIPE SIZE D (DD) FROM THE 0-50' OR THE 51-80' PIPE CHART. THE COVERAGE PERCENTAGE CHOSEN SHOULD BE HIGH ENOUGH TO INCLUDE ANY SIGN PANELS WHICH MAY POTENTIALLY BE PLACED ON THE SIGN IN THE FUTURE.

C. TO DETERMINE "D" FOR THE SELECTION CHARTS ADD THE AREA OF THE EXIT PANEL, IF PRESENT, TO THE MAIN SIGN PANEL AREA. O'BRIEN THE MAIN PANEL LENGTH TO OBTAIN "D".

D. IF NO PIPE IS SHOWN FOR A CERTAIN SPAN THIS INDICATES THAT THIS SPAN / SIGN PANEL / HEIGHT COMBINATION EXCEEDS THE LIMITS OF THIS STANDARD.

E. ON THE OVERHEAD SIGN SECTION SHEET INDICATE THE DIAMETER OF THE TUBE, THE HEIGHT "H" AND THE SPAN.

F. OBTAIN THE DESIGN WIND SPEEDS FROM THE OVERHEAD SIGN SECTION SHEETS IN THE ROADWAY PLANS.

80 MPH WIND

<table>
<thead>
<tr>
<th>&quot;H&quot; (feet)</th>
<th>20'</th>
<th>25'</th>
<th>30'</th>
<th>50'</th>
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<tbody>
<tr>
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</tbody>
</table>

80 MPH WIND

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<tr>
<th>&quot;H&quot; (feet)</th>
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<th>30'</th>
<th>50'</th>
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</table>

PROCEDURE TO DETERMINE THE DESIGN WIND SPEED:

80 MPH IS THE STANDARD DESIGN WIND SPEED FOR THE STATE OF COLORADO. THE STANDARD DESIGN WIND SPEEDS OF 80 MPH IS TO BE USED AT ALL LOCATIONS EXCEPT THE FOLLOWING:

1. USE THE 80 MPH WIND SPEED FOR LOCATIONS WITHIN A MILE OF EITHER SIDE OF THE BASE OF THE FOOTINGS ALONG THE FRONT RANGE OF THE EASTERN SLOPE.

2. USE THE 100 MPH WIND SPEED FOR LOCATIONS IN BOULDER COUNTY.

IF THERE ARE QUESTIONS CONCERNING THE APPLICABLE WIND SPEED CONTACT THE BRIDGE BRANCH.
**STATIC SIGN BRIDGE PIPE SELECTION TABLES**

**TYPICAL VERTICAL POST SIGN BRIDGE**

**STRUCTURE SELECTION PROCEDURE FOR SIGN BRIDGES**

A. Design is based on a sign height of 15" with side of the span length covered up until the capacity of the largest pole shown is reached. Beyond this point the capacity decreases.

B. The maximum primary panel height is 14". Add the area of all exit panels to the area of all primary panels to equal against maximum sign panel area.

C. Obtain the design wind speed from the overhead sign X-SECTION SHEETS in the roadway plans.

D. Pick pipe ID and split size from the appropriate chart. Include the area of all sign panels shown in the overhead sign X-SECTION SHEETS which may potentially be placed on the sign in the future.

E. If no pole/beam size is shown for a certain span this indicates that this span's sign panel/beam ID combination exceeds the limits of this standard.

F. The overhead sign X-SECTION SHEETS indicate the height 1", the span and the sign panel sizes.

<table>
<thead>
<tr>
<th>SPAN (in.)</th>
<th>MAXIMUM SIGN PANEL AREA (sq. ft.)</th>
<th>PIPE CO. ID 1 (in.)</th>
<th>SPLIT ID 1 (in.)</th>
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<tbody>
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**PROCEDURE TO DETERMINE THE DESIGN WIND SPEED**

80 MPH is the standard design wind speed for the State of Colorado. The standard design wind speed of 80 MPH is to be used at all locations except the following:

1. Use the 90 MPH wind speed for locations within 5 miles of either side of the base of the foothills along the front range of the eastern slopes.

2. Use the 100 MPH wind speed for locations in Boulder County.

3. If there are questions concerning the precise design wind speed contact the staff bridge branch.

**Computer File Information**

- **Creation Date**: 07-24-06
- **Modification Date**: 07-04-06
- **Full Path**: www.dot.state.co.us/designsupport
- **Drawing File Name**: 56143000314.dwg
- **CAD Version**: 2004

**Sheet Revisions**

- **Date**: 07/24/06
- **Comments**: Updated

**Colorado Department of Transportation**

- **Address**: 4001 East Arkansas Avenue
- **Phone**: 303-757-9043
- **Fax**: 303-757-9030

**Safety & Traffic Engineering Branch**

**MONOTUBE OVERHEAD SIGNS**

**STANDARD PLAN NO.**

- **S-614-50**

**Issued By**: Traffic Engineering Unit, July 4, 2006

**Sheet No.**: 13 of 14
CAISSON DRILLING AND INSTALLATION NOTES

1. CONTACT THE ENGINEER IF ANY OF THE FOLLOWING SOIL CONDITIONS ARE ENCOUNTERED DURING DRILLING:
   a) THE SOIL HAS A HIGH ORGANIC CONTENT OR CONSISTS OF SATURATED Silt and Clay
   b) THE SITE WON’T SUPPORT THE WEIGHT OF THE DRILLING RIG
   c) THE FOUNDATION SOILS ARE HETEROGENEOUS
   d) FIRM BEDROCK IS ENCOUNTERED

2. CAISSONS SHALL BE PLACED AGAINST UNDISTURBED EARTH

3. THE FOLLOWING SOIL PARAMETERS WERE USED FOR DESIGN:
   a) LOOSE GRANULAR SOIL WITH A UNIT WEIGHT OF 100 PFS AND A 29 DEGREE ANGLE OF INTERNAL FRICTION (PHI ANGLE)
   b) SOFT COHESIVE SOIL WITH A UNIT WEIGHT OF 100 PFS AND A UNIT COHESION OF 500 PFS


CAISSON FOUNDATION DETAILS
ROADSIDE SHOULDER INSTALLATION

(CHECK ROADWAY SHOULDER INSTALLATION FOR ADDITIONAL INFORMATION)