Guide Rail Inspection & Inventory Reference Manual

Compiled by Robert Gorka

The Guide Rail Inspection & Inventory Manual is a reference booklet and is intended to identify existing guide rail systems. This manual is a supplement to Chapter 10 of the Highway Design Manual. The Highway Design Manual should be consulted to verify current design criteria.
How To Measure Rail Height: 
(With Drop Off @ Edge Of Shoulder)

3 Strand Cable Barrier

Box Beam Barrier

W-Beam Barrier

Rail Items:

Box Beam Median Barrier

Normal Height: 30 in
Max. Height: 33 in
Min. Height: 27 in
Post Spacing*: 6 ft
Deflection Dist.: 3 ft

W-Beam Median Barrier

Weak Post
Normal Height: 33 in
Max. Height: 36 in
Min. Height: 30 in
Post Spacing*: 12.5 ft
Deflection Dist.: 7 ft

Heavy Post
Normal Height: 29 in
Max. Height: 30 in
Min. Height: 28 in
Post Spacing*: 6.25 ft
Deflection Dist.: 3 ft

Concrete NJ Shape & Single Slope Barrier

* See page 24 for other post spacing/deflection distance combinations

Note: In all cases where there is no drop off measure height from the surface directly below the barrier. Measure from the pavement surface if curb is present within 12 inches of the railing.
<table>
<thead>
<tr>
<th>Steelbacked Timber Barrier</th>
<th>Timber Barrier</th>
<th>Rail Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.8</td>
<td>2.7</td>
<td>3.0</td>
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<tr>
<td>0</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>12</td>
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<tr>
<td>3</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
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<tr>
<td>1</td>
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<td>3-1/2</td>
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<td>6</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>6</td>
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</tbody>
</table>

Table 10.3: Barrier Selections for Standard Impacts
### Table 10-7 Acceptable Barrier Heights When Upgrading Existing Facilities

<table>
<thead>
<tr>
<th>Barrier Type</th>
<th>Normal Height¹ (in)</th>
<th>Acceptable Heights⁵</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rail/Barrier Height</td>
<td>Post Height</td>
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<tr>
<td></td>
<td></td>
<td>Upper (in)</td>
<td>Lower (in)</td>
<td>Upper (in)</td>
<td>Lower (in)</td>
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<td><strong>Roadside Barriers</strong></td>
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<tr>
<td>Cable</td>
<td>29²</td>
<td>31²</td>
<td>27²</td>
<td>34</td>
<td>30</td>
</tr>
<tr>
<td>W-beam³ (weak-post)</td>
<td>32³</td>
<td>35³</td>
<td>29³</td>
<td>35¾</td>
<td>29¾</td>
</tr>
<tr>
<td>W-beam³ (Heavy-post)</td>
<td>29³</td>
<td>30³</td>
<td>28³</td>
<td>31</td>
<td>29</td>
</tr>
<tr>
<td>Box beam</td>
<td>27³</td>
<td>30³</td>
<td>24³</td>
<td>30</td>
<td>24</td>
</tr>
<tr>
<td>32” Concrete (NJ&amp;F shapes)</td>
<td>32⁴</td>
<td>33⁴</td>
<td>29⁴</td>
<td>-</td>
<td>-</td>
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<tr>
<td>42” Concrete (F and Single Slope)</td>
<td>42⁴</td>
<td>43⁴</td>
<td>32</td>
<td>-</td>
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<td><strong>Median Barriers</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cable</td>
<td>28²</td>
<td>30²</td>
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<td>Box beam</td>
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<td>26¾</td>
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</tr>
<tr>
<td>32” Concrete (NJ&amp;F shapes)</td>
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<td>33⁴</td>
<td>29⁴</td>
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<td>-</td>
</tr>
<tr>
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<td>42⁴</td>
<td>43⁴</td>
<td>32</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Notes:**
1. Normally measured from the surface directly below the barrier. Measure from the pavement surface if curb is present within 12 inches of the railing.
2. Center of top cable at mounting point.
3. Top of rail at post.
4. Top of barrier.
5. Measured after resurfacing, when applicable.
6. The W-beam referred to is the Modified G2. Most weak post W-beam currently in service at the time of this publication is the older G2 system. The Modified G2 was developed to address vaulting problems with the G2. Among the changes was a two-inch increase in rail height from 30” to 32”. The old height criteria for existing G2 systems previously allowed a minimum height of 27” which is no longer permitted. Whether a weak post W-beam is the G2 or the Modified G2, the allowable height range for existing installations is 29” to 35”. (In the G2, the rail splice was fastened to the post. In the Modified G2, the splice is between the mounting posts.).

See page 25 for instruction on how to measure rail height when there is a drop off at the edge of shoulder.

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**Rail Items:**

**Rustic Box Beam Barrier**

**Painted/Powder Coated Box Beam Barrier**

**Shop Curve**
**Issues:**

Cables Protecting Deep Water

Inadequate Tension In Cable Barrier

Rail Splices Lapped Against The Flow of Traffic

**Post Items:**

Heavy Post With Wood & Synthetic Block Out

“S” Post

“C” Post
**Issues:**

- More Than 3 Bent Adjacent Posts
- Exposed Soil Plates
- Leaning W-Beam

**End Treatments:**

- W-Beam Spade & Boxing Glove
- W-Beam Classic Turndown
- W-Beam Driveway Turndown
**Issues:**

External Box Beam Coupling — Installed Before 1975

2 Bolt Connection — Installed Before 1975

Box Beam Heat Number & Makers Mark

Imprinted heat number or makers mark indicate the rail was installed after June 12, 1975. Box beam guide rail or median barrier installed prior to June 12, 1975 are not to be reset and should be removed and replaced whenever practical

**End Treatments:**

Box Beam Type 0

Box Beam End Piece
(Known As Box Beam Type I Prior to 7/2/10)

Box Beam Type II (Disapproved 7/2/10)
Transition From Box Beam To Cable

Transition From Box Beam To W Beam

Transitions:

End Treatments:

Includes T8 shop curve and box beam end piece

Box Beam Type II End Assembly

Box Beam Modified Type I End Assembly

Includes T8 shop curve and box beam end piece
Transitions:
- Box Beam Pier Protection

End Treatments:
- Box Beam Type III: WYBET
- Box Beam Type III: BEAT

Transition From Box Beam To Bridge Rail

Transition From Box Beam To Concrete Barrier

Cable Anchor Block
Attenuator Device: Sand Barrels

Attenuator Device: Quadguard

Median Box Beam Type C

Median Box Beam Type B

Attenuator Device: Rect 350

End Treatments: