INTRODUCTION

The following pages show the estimated reaction forces of a backstop—up to the point of structure that is custom designed for each individual project. Custom-designed structure may add overall weight to the assembly, but normally distributes these reaction forces to the building attachment points.

Final reaction magnitude and locations cannot be determined until the backstop is engineered, but this document is meant to serve as a worst-case guide for your project. The reaction forces are based on the weight of the backstop (including the heaviest backboard, height adjuster, etc) and a 0.7 Seismic Factor.

CLICK ON YOUR ATTACHMENT HEIGHT BELOW:

<table>
<thead>
<tr>
<th>18' Attachment Height</th>
<th>23' Attachment Height</th>
<th>28' Attachment Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>19' Attachment Height</td>
<td>24' Attachment Height</td>
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<td>20' Attachment Height</td>
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<td>21' Attachment Height</td>
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<td>22' Attachment Height</td>
<td>27' Attachment Height</td>
<td>32' Attachment Height</td>
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WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD = 491 lbs (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK) + PLEASE NOTE THESE ARE ESTIMATED WEIGHT LOADS FROM THE BACKSTOP MAST HANGERS TO THE FLOOR. THESE ESTIMATES DO NOT INCLUDE ANY SUPERSTRUCTURE WEIGHTS.

WEIGHT LOAD AT POINT "A" = 477 lbs (WEIGHT OF REAR BRACE) + WEIGHT OF MAST + WEIGHT OF BANK

WEIGHT LOAD AT POINT "B" = 50 lbs (WEIGHT OF REAR BRACE) + WEIGHT OF PULLEY

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7 (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB) = 264 lbs x SEISMIC FACTOR X DISTANCE TO MIDPOINT OF BANK (DRB) = 998 ft.lbs SEISMIC MOMENT (WB) (FT.lbs)

WEIGHT OF REAR BRACE (WFB) = 27 lbs x SEISMIC FACTOR X DISTANCE TO MIDPOINT OF REAR BRACE (DRB) = 60 ft.lbs SEISMIC MOMENT (WFB) (FT.lbs)

WEIGHT OF MAST (WM) = 200 lbs x SEISMIC FACTOR X DISTANCE TO MIDPOINT OF MAST (DM) = 462 ft.lbs SEISMIC MOMENT (WM) (FT.lbs)

WB + WFB + WM = BACKSTOP'S TOTAL WEIGHT LOAD

1520 ft.lbs SUM OF THE MOMENTS = WB + WFB + WM

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

REACTIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK DOWN

RC,VA VERTICAL REACTIONS AT POINT A: 613 lbs = WEIGHT LOAD AT POINT "A" - SUM OF THE MOMENTS
2 SUPPORTS DISTANCE BETWEEN SUPPORTS (A-V-A) 2

RC,HVA HORIZONTAL REACTION AT POINT A: 172 lbs = BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR
2 SUPPORTS

REactions at hingeline at point b from weight loads and seismic perpendicular to bank (fig. 1)

BANK DOWN

RC,VB VERTICAL REACTION AT POINT B: 430 lbs = WEIGHT OF REAR BRACE - SUM OF THE MOMENTS
2 SUPPORTS DISTANCE BETWEEN SUPPORTS (A-B)

RC,HVB HORIZONTAL REACTION AT POINT B: 237 lbs = SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF REAR BRACE X 2

point reactions from weight loads and seismic with bank up

host cable tension at point b: 374 lbs = SUM OF THE MOMENTS
SEISMIC FACTOR X DISTANCE FROM A TO B

REACTIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK UP

RC,VA VERTICAL REACTION AT POINT A: 56 lbs = BACKSTOP'S TOTAL WEIGHT LOAD - HOST CABLE TENSION
2 SUPPORTS

RC,HVA HORIZONTAL REACTION AT POINT A: 380 lbs = SUM OF THE MOMENTS
FROM SEISMIC PARALLEL TO BANK
DISTANCE FROM A TO A

REACTIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 1)

BANK UP

RC,VB VERTICAL REACTION AT POINT B: 424 lbs = HOST CABLE TENSION + WEIGHT OF REAR BRACE
2 SUPPORTS

RC,HVB HORIZONTAL REACTION AT POINT B: 374 lbs = HOST CABLE TENSION
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

- **Backstops Total Weight Load**: 503 lbs (Weight of Rear Brace + Weight of Mast + Weight of Bank) + Please note these are estimated weight loads from the backstop mast hangers to the floor. These estimates do not include any superstructure weights.

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

<table>
<thead>
<tr>
<th>Element</th>
<th>Factor</th>
<th>Multiplication</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight of Bank (W)</td>
<td>0.7</td>
<td>Varies with seismic zone, rigidity of support &amp; room use</td>
<td>1183 ft-lbs Seismic Moment (W) (FT, LBS)</td>
</tr>
<tr>
<td>Weight of Rear Brace (W')</td>
<td>27 lbs</td>
<td>Seismic Factor</td>
<td>70 ft-lbs Seismic Moment (W') (FT, LBS)</td>
</tr>
<tr>
<td>Weight of Mast (M)</td>
<td>212 lbs</td>
<td>Seismic Factor</td>
<td>564 ft-lbs Seismic Moment (M) (FT, LBS)</td>
</tr>
</tbody>
</table>

W + W' + M = Backstops Total Weight Load

SUM OF THE MOMENTS = 1817 ft-lbs

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

- **Bank Down**
  - Vertical Reaction at Point A: 696 lbs = Weight Load at Point A
  - Horizontal Reaction at Point A: 176 lbs = Backstops Total Weight Load x Seismic Factor

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PERPENDICULAR TO BANK (FIG. 1)

- **Bank Down**
  - Vertical Reaction at Point B: 317 lbs = Weight of Rear Brace
  - Horizontal Reaction at Point B: 246 lbs = Sum of the Moments

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

Hosst Cable Tension at Point B: 382 lbs = Sum of the Moments

REASONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

- **Bank Up**
  - Vertical Reaction at Point A: 60 lbs = Backstops Total Weight Load - Hosst Cable Tension
  - Horizontal Reaction at Point A: From Seismic Parallel to Bank

REASONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 1)

- **Bank Up**
  - Vertical Reaction at Point B: 432 lbs = Hosst Cable Tension + Weight of Rear Brace
  - Horizontal Reaction at Point B: 382 lbs = Hosst Cable Tension
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOPS TOTAL WEIGHT LOAD = 520 lbs (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK) + PLEASE NOTE THESE ARE ESTIMATED WEIGHT LOADS FROM THE BACKSTOP MAST HANGERS TO THE FLOOR. THESE ESTIMATES DO NOT INCLUDE ANY SUPERSTRUCTURE WEIGHTS.

WEIGHT LOAD AT POINT "A" = 512 lbs (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK)

WEIGHT LOAD AT POINT "B" = 53 lbs (WEIGHT OF REAR BRACE + WEIGHT OF PULLEY)

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7 (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB) = 264 lbs X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF BANK (DRB)
WEIGHT OF REAR BRACE (WRB) = 34 lbs X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF REAR BRACE (DRB)
WEIGHT OF MAST (WM) = 231 lbs X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF MAST (DM)

WB + WRB + WM = BACKSTOPS TOTAL WEIGHT LOAD

2162 lbs = SUM OF THE MOMENTS = WB + WRB + WM

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 1)

BANK DOWN

RCw = VERTICAL REACTIONS AT POINT A: 668 lbs = WEIGHT LOAD AT POINT "A" / SUM OF THE MOMENTS
2 SUPPORTS / DISTANCE BETWEEN SUPPORTS (A-A')

RCw = HORIZONTAL REACTION AT POINT A: 185 lbs = BACKSTOPS TOTAL WEIGHT LOAD X SEISMIC FACTOR / 2 SUPPORTS

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PERPENDICULAR TO BANK (FIG. 1)

BANK DOWN

RCw = VERTICAL REACTIONS AT POINT B: 331 lbs = WEIGHT OF REAR BRACE / SUM OF THE MOMENTS
2 SUPPORTS / DISTANCE BETWEEN SUPPORTS (A-B)

RCw = HORIZONTAL REACTION AT POINT B: 257 lbs = SUM OF THE MOMENTS / DISTANCE TO MIDPOINT OF REAR BRACE X 2

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK UP

RCw = VERTICAL REACTIONS AT POINT A: 67 lbs = BACKSTOPS TOTAL WEIGHT LOAD - HOIST CABLE TENSION / 2 SUPPORTS

RCw = HORIZONTAL REACTION AT POINT A: 432 lbs = SUM OF THE MOMENTS / DISTANCE FROM A TO A

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 1)

BANK UP

RCw = VERTICAL REACTIONS AT POINT B: 449 lbs = HOIST CABLE TENSION + WEIGHT OF REAR BRACE / 2 SUPPORTS

RCw = HORIZONTAL REACTION AT POINT B: 356 lbs = HOIST CABLE TENSION

STATIC EQUIVALENT LOADING FOR: 951 Style Backstop 20' Attachment Height

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PAGE No.
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOPS TOTAL WEIGHT LOAD = 539 lbs = (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK)

WEIGHT LOAD AT POINT "A" = 522 lbs = (WEIGHT OF REAR BRACE / 2) + WEIGHT OF MAST + WEIGHT OF BANK

WEIGHT LOAD AT POINT "B" = 53 lbs = (WEIGHT OF REAR BRACE / 2) + WEIGHT OF PULLEY

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7 (VARES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB) = 264 lbs X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF BANK (DB)
WEIGHT OF REAR BRACE (WBR) = 34 lbs X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF REAR BRACE (DRB)
WEIGHT OF MAST (WM) = 24 lbs X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF MAST (DX)

WB + WBR + WM = BACKSTOPS TOTAL WEIGHT LOAD

2474 lbs SUM OF THE MOMENTS = WBR + WBR + WM

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK DOWN

R<sub>CA</sub> VERTICAL REACTIONS AT POINT A: 756 lbs = SUM OF THE MOMENTS
WEIGHT LOAD AT POINT "A" 2 SUPPORTS
DISTANCE BETWEEN SUPPORTS (A to A)

R<sub>CA</sub> HORIZONTAL REACTION AT POINT A: 189 lbs = BACKSTOPS TOTAL WEIGHT LOAD X SEISMIC FACTOR
2 SUPPORTS

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PERPENDICULAR TO BANK (FIG. 1)

BANK DOWN

R<sub>CB</sub> VERTICAL REACTION AT POINT B: 440 lbs = SUM OF THE MOMENTS
WEIGHT OF REAR BRACE 2 SUPPORTS
WEIGHT OF PULLEY
DISTANCE BETWEEN SUPPORTS (A to B)

R<sub>CB</sub> HORIZONTAL REACTION AT POINT B: 263 lbs = SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF REAR BRACE X 2

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOST CABLE TENSION AT POINT B: 552 lbs = SUM OF THE MOMENTS
SEISMIC FACTOR X DISTANCE FROM A TO B

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK UP

R<sub>CA</sub> VERTICAL REACTION AT POINT A: -6.5 lbs = BACKSTOPS TOTAL WEIGHT LOAD - HOST CABLE TENSION
2 SUPPORTS

R<sub>CA</sub> HORIZONTAL REACTION AT POINT A: 495 lbs = SUM OF THE MOMENTS
FROM SEISMIC PARALLEL TO BANK
DISTANCE FROM A TO A

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 1)

BANK UP

R<sub>CB</sub> VERTICAL REACTION AT POINT B: 605 lbs = HOST CABLE TENSION + WEIGHT OF REAR BRACE 2 SUPPORTS
WEIGHT OF PULLEY

R<sub>CB</sub> HORIZONTAL REACTION AT POINT B: 552 lbs = HOST CABLE TENSION
## WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

<table>
<thead>
<tr>
<th>Weight Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backstop's Total Weight Load</td>
</tr>
<tr>
<td>558 lbs (Weight of Rear Brace + Weight of Mast + Weight of Bank)</td>
</tr>
</tbody>
</table>

**Please note these are estimated weight loads from the backstop mast hangers to the floor. These estimates do not include any superstructure weights.**

### Seismic Factored Moments and Sum of Moments for Backstop Elements

| Seismic Factor | 0.7 (Varies with seismic zone, rigidity of support & room use) |
|---------------|
| Weight of Bank (WB) | 264 lbs x Seismic Factor x Distance to Midpoint of Bank (DR) |
| Weight of Rear Brace (WFR) | 34 lbs x Seismic Factor x Distance to Midpoint of Rear Brace (DRB) |
| Weight of Mast (WM) | 264 lbs x Seismic Factor x Distance to Midpoint of Mast (DM) |

\[
\text{WB} + \text{WFR} + \text{WM} = \text{Backstop's Total Weight Load}
\]

\[
2626 \text{ lbs} = \text{Sum of the Moments} = \text{WB} + \text{WFR} + \text{WM}
\]

## POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

### Reactions at Hinge Line at Point A from Weight Loads and Seismic Parallel to Bank (Fig. 2)

**BANK DOWN**

- **Vertical Reactions** at Point A:
  - 764 lbs = Weight Load at Point A
  - 2 Supports

- **Horizontal Reaction at Point A**:
  - 195 lbs = Backstop's Total Weight Load x Seismic Factor
  - 2 Supports

### Reactions at Hinge Line at Point B from Weight Loads and Seismic Perpendicular to Bank (Fig. 1)

**BANK DOWN**

- **Vertical Reaction at Point B**:
  - 435 lbs = Weight of Rear Brace
  - 2 Supports

- **Horizontal Reaction at Point B**:
  - 272 lbs = Sum of the Moments
  - Distance to midpoint of rear brace x 2

## POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

### Reactions at Hinge Line at Point A from Weight Loads and Seismic Parallel to Bank (Fig. 2)

**BANK UP**

- **Vertical Reaction at Point A**:
  - 6 lbs = Backstop's Total Weight Load - Host Cable Tension
  - 2 Supports

- **Horizontal Reaction at Point A** from Seismic Parallel to Bank:
  - 514 lbs = Sum of the Moments
  - Distance from A to A

### Reactions at Hinge Line at Point B from Weight Loads and Seismic Parallel to Bank (Fig. 1)

**BANK UP**

- **Vertical Reaction at Point B**:
  - 599 lbs = Host Cable Tension + Weight of Rear Brace
  - 2 Supports

- **Horizontal Reaction at Point B**:
  - 546 lbs = Host Cable Tension

---

**Static Equivalent Loading for:**

**951 Style Backstop**

**22' Attachment Height**

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WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOPS TOTAL WEIGHT LOAD = 578 lbs (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK)

WEIGHT LOAD AT POINT "A" = 561 lbs \( \frac{\text{WEIGHT OF REAR BRACE}}{2} + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} \)

WEIGHT LOAD AT POINT "B" = 56 lbs \( \frac{\text{WEIGHT OF REAR BRACE}}{2} + \text{WEIGHT OF MAST} + \text{WEIGHT OF PULLEY} \)

PLEASE NOTE THESE ARE ESTIMATED WEIGHT LOADS FROM THE BACKSTOP MAST HANGERS TO THE FLOOR. THESE ESTIMATES DO NOT INCLUDE ANY SUPERSTRUCTURE WEIGHTS.

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7 (VARIIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB) = 264 lbs \( \times \) SEISMIC FACTOR \( \times \) DISTANCE TO MIDPOINT OF BANK (DB) = 1922 lbs \( \text{SEISMIC MOMENT (WB) (FT-lb)} \)

WEIGHT OF REAR BRACE (WFB) = 40 lbs \( \times \) SEISMIC FACTOR \( \times \) DISTANCE TO MIDPOINT OF REAR BRACE (DRB) = 150 lbs \( \text{SEISMIC MOMENT (WFB) (FT-lb)} \)

WEIGHT OF MAST (WM) = 270 lbs \( \times \) SEISMIC FACTOR \( \times \) DISTANCE TO MIDPOINT OF MAST (DM) = 1050 lbs \( \text{SEISMIC MOMENT (WM) (FT-lb)} \)

\( \text{WB + WFB + WM = BACKSTOPS TOTAL WEIGHT LOAD} \)

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

REACTIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK DOWN

\( R_{\text{CA}} \) VERTICAL REACTIONS AT POINT A: 558 lbs = \( \frac{\text{WEIGHT LOAD AT POINT "A"}}{2 \, \text{Supports}} \)

\( R_{\text{CH}} \) HORIZONTAL REACTION AT POINT A: 202 lbs = \( \frac{\text{BACKSTOPS TOTAL WEIGHT LOAD} \times \text{SEISMIC FACTOR}}{2 \, \text{Supports}} \)

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PERPENDICULAR TO BANK (FIG. 1)

BANK DOWN

\( R_{\text{CB}} \) VERTICAL REACTION AT POINT B: 435 lbs = \( \frac{\text{WEIGHT OF REAR BRACE}}{2 \, \text{Supports}} + \frac{\text{WEIGHT OF PULLEY}}{2 \, \text{Supports}} \)

\( R_{\text{CL}} \) HORIZONTAL REACTION AT POINT B: 279 lbs = \( \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE BETWEEN SUPPORTS (A-B)}} \)

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOIST CABLE TENSION AT POINT B: 540 lbs = \( \frac{\text{SUM OF THE MOMENTS}}{\text{SEISMIC FACTOR \times \text{DISTANCE FROM A TO B}}} \)

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK UP

\( R_{\text{CA}} \) VERTICAL REACTION AT POINT A: 19 lbs = \( \frac{\text{BACKSTOPS TOTAL WEIGHT LOAD} \times \text{HOIST CABLE TENSION}}{2 \, \text{Supports}} \)

\( R_{\text{CH}} \) HORIZONTAL REACTION AT POINT A: 578 lbs = \( \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE FROM A TO A}} \)

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 1)

BANK UP

\( R_{\text{CB}} \) VERTICAL REACTION AT POINT B: 590 lbs = \( \frac{\text{HOIST CABLE TENSION} + \text{WEIGHT OF REAR BRACE}}{2 \, \text{Supports}} + \frac{\text{WEIGHT OF PULLEY}}{2 \, \text{Supports}} \)

\( R_{\text{CL}} \) HORIZONTAL REACTION AT POINT B: 540 lbs = \( \text{HOIST CABLE TENSION} \)
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOPS TOTAL WEIGHT LOAD = 594 lbs (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK)

WEIGHT LOAD AT POINT "A" = 574 lbs (WEIGHT OF REAR BRACE / 2) + WEIGHT OF MAST + WEIGHT OF BANK

WEIGHT LOAD AT POINT "B" = 56 lbs (WEIGHT OF REAR BRACE / 2) + WEIGHT OF PULLEY

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTops ELEMENTS

SEISMIC FACTOR = 0.7 (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB) 264 lbs x SEISMIC FACTOR x DISTANCE TO MIDPOINT OF BANK (DB) = 2107 ft lbs SEISMIC MOMENT (WB) (FT,lb,5)

WEIGHT OF REAR BRACE (WFB) 40 lbs x SEISMIC FACTOR x DISTANCE TO MIDPOINT OF REAR BRACE (DBR) = 174 ft lbs SEISMIC MOMENT (WFB) (FT,lb,5)

WEIGHT OF MAST (WM) 250 lbs x SEISMIC FACTOR x DISTANCE TO MIDPOINT OF MAST (DM) = 1279 ft lbs SEISMIC MOMENT (WM) (FT,lb,5)

WB + WFB + WM = BACKSTOPS TOTAL WEIGHT LOAD

SUM OF THE MOMENTS = 3560 ft lbs

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK DOWN

\[ R_{Vx} = \frac{WEIGHT LOAD AT POINT "A" \times \sum \text{OF THE MOMENTS}}{DISTANCE BETWEEN SUPPORTS (A\_A)} \]

\[ R_{Hx} = \frac{2 \text{ SUPPORTS} \times 26 \text{ lbs}}{2 \text{ SUPPORTS}} \]

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PERPENDICULAR TO BANK (FIG. 1)

BANK DOWN

\[ R_{Vx} = \frac{WEIGHT OF REAR BRACE \times \sum \text{OF THE MOMENTS}}{DISTANCE BETWEEN SUPPORTS (A\_A)} \]

\[ R_{Hx} = \frac{287 \text{ lbs}}{2 \text{ SUPPORTS}} \]

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOST CABLE TENSION AT POINT B = 541 lbs (SUM OF THE MOMENTS / SEISMIC FACTOR x DISTANCE FROM A TO B)

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK UP

\[ R_{Vx} = \frac{2 \text{ SUPPORTS} \times 26 \text{ lbs}}{2 \text{ SUPPORTS}} \]

\[ R_{Hx} = \frac{563 \text{ lbs} \times \sum \text{OF THE MOMENTS}}{DISTANCE FROM A \_A} \]

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 1)

BANK UP

\[ R_{Vx} = \frac{WEIGHT OF REAR BRACE \times \sum \text{OF THE MOMENTS}}{2 \text{ SUPPORTS}} \]

\[ R_{Hx} = \frac{541 \text{ lbs} \times \sum \text{OF THE MOMENTS}}{2 \text{ SUPPORTS}} \]
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOPS TOTAL WEIGHT LOAD = 503 lbs (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK) + PLEASE NOTE THESE ARE ESTIMATED WEIGHT LOADS FROM THE BACKSTOP MAST HANGERS TO THE FLOOR. THESE ESTIMATES DO NOT INCLUDE ANY SUPERSTRUCTURE WEIGHTS.

WEIGHT LOAD AT POINT "A" = 503 lbs (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK) / 2

WEIGHT LOAD AT POINT "B" = 503 lbs (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK) / 2 + WEIGHT OF PULLEY

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7 (VARIABLES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB) = 264 lbs x SEISMIC FACTOR x DISTANCE TO MIDPOINT OF BANK (DB) = 2291 ft-lbs SEISMIC MOMENT (WB) (FT-lbs)

WEIGHT OF REAR BRACE (WFRB) = 40 lbs x SEISMIC FACTOR x DISTANCE TO MIDPOINT OF REAR BRACE (DRB) = 166 ft-lbs SEISMIC MOMENT (WFRB) (FT-lbs)

WEIGHT OF MAST (WM) = 296 lbs x SEISMIC FACTOR x DISTANCE TO MIDPOINT OF MAST (DM) = 1423 ft-lbs SEISMIC MOMENT (WM) (FT-lbs)

WB + WFRB + WM = BACKSTOPS TOTAL WEIGHT LOAD

SUM OF THE MOMENTS = 3902 ft-lbs

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK DOWN

\[ R_{h}^{a} \]

VERTICAL REACTIONS AT POINT A:

\[ 942 \text{ lbs} = \text{WEIGHT LOAD AT POINT A} \]

\[ \frac{2 \text{ SUPPORTS}}{\text{SUM OF THE MOMENTS}} \]

\[ \frac{211 \text{ lbs}}{\text{DISTANCE BETWEEN SUPPORTS (A-B)}} \]

HORIZONTAL REACTION AT POINT A:

\[ 942 \text{ lbs} = \text{WEIGHT LOAD AT POINT A} \]

\[ \frac{2 \text{ SUPPORTS}}{\text{SUM OF THE MOMENTS}} \]

\[ \frac{211 \text{ lbs}}{\text{DISTANCE BETWEEN SUPPORTS (A-B)}} \]

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PERPENDICULAR TO BANK (FIG. 1)

BANK DOWN

\[ R_{h}^{b} \]

VERTICAL REACTIONS AT POINT B:

\[ 432 \text{ lbs} = \text{WEIGHT OF REAR BRACE} \]

\[ \frac{2 \text{ SUPPORTS}}{\text{WEIGHT OF PULLEY}} \]

\[ \frac{291 \text{ lbs}}{\text{SUM OF THE MOMENTS}} \]

\[ \frac{291 \text{ lbs}}{\text{DISTANCE TO MIDDLEPOINT OF REAR BRACE X 2}} \]

HORIZONTAL REACTION AT POINT B:

\[ 291 \text{ lbs} = \text{SUM OF THE MOMENTS} \]

\[ \frac{291 \text{ lbs}}{\text{DISTANCE TO MIDDLEPOINT OF REAR BRACE X 2}} \]

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK UP

\[ R_{u}^{a} \]

VERTICAL REACTIONS AT POINT A:

\[ 33 \text{ lbs} = \text{BACKSTOPS TOTAL WEIGHT LOAD - HOIST CABLE TENSION} \]

\[ \frac{2 \text{ SUPPORTS}}{\text{SUM OF THE MOMENTS}} \]

\[ 650 \text{ lbs} = \text{SUM OF THE MOMENTS} \]

\[ \frac{650 \text{ lbs}}{\text{DISTANCE FROM A TO A}} \]

HORIZONTAL REACTION AT POINT A:

\[ 33 \text{ lbs} = \text{BACKSTOPS TOTAL WEIGHT LOAD - HOIST CABLE TENSION} \]

\[ \frac{2 \text{ SUPPORTS}}{\text{SUM OF THE MOMENTS}} \]

\[ 650 \text{ lbs} = \text{SUM OF THE MOMENTS} \]

\[ \frac{650 \text{ lbs}}{\text{DISTANCE FROM A TO A}} \]

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 1)

BANK UP

\[ R_{u}^{b} \]

VERTICAL REACTIONS AT POINT B:

\[ 536 \text{ lbs} = \text{HOIST CABLE TENSION + WEIGHT OF REAR BRACE} \]

\[ \frac{2 \text{ SUPPORTS}}{\text{WEIGHT OF PULLEY}} \]

\[ 536 \text{ lbs} = \text{HOIST CABLE TENSION} \]

\[ \frac{536 \text{ lbs}}{\text{WEIGHT OF REAR BRACE} + \text{WEIGHT OF PULLEY}} \]

\[ \frac{536 \text{ lbs}}{\text{WEIGHT OF REAR BRACE}} \]

\[ \frac{536 \text{ lbs}}{\text{WEIGHT OF PULLEY}} \]

\[ \frac{536 \text{ lbs}}{\text{DISTANCE FROM A TO A}} \]
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

**Backstops Total Weight Load**
- 631 lbs (Weight of Rear Brace + Weight of Mast + Weight of Bank)

**Weight Load at Point "A"**
- 607 lbs \( \frac{\text{Weight of Rear Brace}}{2} + \text{Weight of Mast} + \text{Weight of Bank} \)

**Weight Load at Point "B"**
- 60 lbs \( \frac{\text{Weight of Rear Brace}}{2} + \text{Weight of Pulley} \)

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

<table>
<thead>
<tr>
<th>Weight of Bank (WB)</th>
<th>264 lbs x Seismic Factor x Distance to Midpoint of Bank (DB)</th>
<th>2746 ft-lbs Seismic Moment (WB) (FT-LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight of Rear Brace (WFB)</td>
<td>47 lbs x Seismic Factor x Distance to Midpoint of Rear Brace (DRB)</td>
<td>2379 ft-lbs Seismic Moment (WFB) (FT-LBS)</td>
</tr>
<tr>
<td>Weight of Mast (WM)</td>
<td>320 lbs x Seismic Factor x Distance to Midpoint of Mast (DM)</td>
<td>1635 ft-lbs Seismic Moment (WM) (FT-LBS)</td>
</tr>
</tbody>
</table>

\[ W = WB + WFB + WM = \text{Backstops Total Weight Load} \]

\[ 4348 \text{ ft-lbs} \text{ Sum of the Moments} = WB + WFB + WM \]

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

**Reactions at Hinge Line at Point A from Weight Loads and Seismic Parallel to Bank (Fig. 2)**

**Bank Down**
- \( R_{CA} \) Vertical Reaction at Point A: 972 lbs \( = \) Value of Weight Load at Point A \( + \) Sum of the Moments \( / 2 \) Supports
- \( R_{CA} \) Horizontal Reaction at Point A: 221 lbs \( = \) Backstops Total Weight Load \( x \) Seismic Factor \( / 2 \) Supports

**Reactions at Hinge Line at Point B from Weight Loads and Seismic Perpendicular to Bank (Fig. 1)**

**Bank Down**
- \( R_{CB} \) Vertical Reaction at Point B: 441 lbs \( = \) Weight of Rear Brace \( / 2 \) Supports
- \( R_{CB} \) Horizontal Reaction at Point B: 362 lbs \( = \) Sum of the Moments \( / \) Distance to Midpoint of Rear Brace \( x \) 2

**Point Reactions from Weight Loads and Seismic with Bank Up**

Host Cable Tension at Point B: 545 lbs \( = \) Sum of the Moments \( / \) Seismic Factor \( x \) Distance from A to B

**Reactions at Hinge Line at Point A from Weight Loads and Seismic Parallel to Bank (Fig. 2)**

**Bank Up**
- \( R_{CA} \) Vertical Reaction at Point A: 45 lbs \( = \) Backstops Total Weight Load \( - \) Host Cable Tension \( / 2 \) Supports
- \( R_{CA} \) Horizontal Reaction at Point A: 669 lbs \( = \) Sum of the Moments \( / \) Distance from A to A

**Reactions at Hinge Line at Point B from Weight Loads and Seismic Parallel to Bank (Fig. 1)**

**Bank Up**
- \( R_{CB} \) Vertical Reaction at Point B: 605 lbs \( = \) Host Cable Tension \( / 2 \) Supports
- \( R_{CB} \) Horizontal Reaction at Point B: 545 lbs \( = \) Host Cable Tension

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WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOPS TOTAL WEIGHT LOAD

\[ \text{WEIGHT LOAD} = 540 \text{ lbs} \cdot \left(\text{WEIGHT OF REAR BRACE} + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} \right) \]

WEIGHT LOAD AT POINT "A"

\[ \text{WEIGHT LOAD AT POINT "A"} = \frac{616 \text{ lbs}}{2} \cdot \left(\text{WEIGHT OF REAR BRACE} + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} \right) \]

WEIGHT LOAD AT POINT "B"

\[ \text{WEIGHT LOAD AT POINT "B"} = \frac{603 \text{ lbs}}{2} \cdot \left(\text{WEIGHT OF REAR BRACE} + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} \right) \]

- PLEASE NOTE THESE ARE ESTIMATED WEIGHT LOADS FROM THE BACKSTOPS MAST HANGERS TO THE FLOOR. THESE ESTIMATES DO NOT INCLUDE ANY SUPERSTRUCTURE WEIGHTS.

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOPS ELEMENTS

SEISMIC FACTOR = 0.7 (VARYING WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

\[ \text{WEIGHT OF BANK (WB)} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF BANK (DR)} = 2661 \text{ lbs} \cdot \text{SEISMIC MOMENT (WB) (FT, lbs)} \]

\[ \text{WEIGHT OF REAR BRACE (WRB)} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF REAR BRACE (DRB)} = 253 \text{ lbs} \cdot \text{SEISMIC MOMENT (WRB) (FT, lbs)} \]

\[ \text{WEIGHT OF MAST (WM)} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF MAST (DMM)} = 1736 \text{ lbs} \cdot \text{SEISMIC MOMENT (WM) (FT, lbs)} \]

\[ \text{WB} + \text{WRB} + \text{WM} = \text{BACKSTOPS TOTAL WEIGHT LOAD} \]

\[ \text{SUM OF THE MOMENTS} = 4710 \text{ ft, lbs} \]

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 1)

BANK DOWN

\[ R_{\text{CA}} = \frac{1033 \text{ lbs} \cdot \text{WEIGHT LOAD AT POINT "A"}}{2 \text{ SUPPORTS}} \]

\[ R_{\text{CA}} = \frac{224 \text{ lbs} \cdot \text{DISTANCE BETWEEN SUPPORTS (A-A)}}{2 \text{ SUPPORTS}} \]

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PERPENDICULAR TO BANK (FIG. 1)

BANK DOWN

\[ R_{\text{CB}} = \frac{440 \text{ lbs} \cdot \text{WEIGHT OF REAR BRACE}}{2 \text{ SUPPORTS}} \]

\[ R_{\text{CB}} = \frac{306 \text{ lbs} \cdot \text{SUM OF THE MOMENTS}}{\text{DISTANCE TO MIDPOINT OF REAR BRACE X 2}} \]

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOIST CABLE TENSION AT POINT B

\[ 543 \text{ lbs} = \text{SUM OF THE MOMENTS} \cdot \text{SEISMIC FACTOR \times DISTANCE FROM A TO B} \]

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK UP

\[ R_{\text{CA}} = \frac{48 \text{ lbs} \cdot \text{BACKSTOPS TOTAL WEIGHT LOAD - HOIST CABLE TENSION}}{2 \text{ SUPPORTS}} \]

\[ 726 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE FROM A TO A}} \]

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 1)

BANK UP

\[ R_{\text{CB}} = \frac{603 \text{ lbs} \cdot \text{HOIST CABLE TENSION} + \text{WEIGHT OF REAR BRACE}}{2 \text{ SUPPORTS}} \]

\[ 543 \text{ lbs} = \text{HOIST CABLE TENSION} \]
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOPS TOTAL WEIGHT LOAD: 561 lbs (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK) + PLEASE NOTE THESE ARE ESTIMATED WEIGHT LOADS FROM THE BACKSTOP MAST HANGERS TO THE FLOOR. THESE ESTIMATES DO NOT INCLUDE ANY SUPERSTRUCTURE WEIGHTS.

WEIGHT LOAD AT POINT "A": 527 lbs (WEIGHT OF REAR BRACE / 2) + WEIGHT OF MAST + WEIGHT OF BANK

WEIGHT LOAD AT POINT "B": 60 lbs (WEIGHT OF MAST W/M) + WEIGHT OF PULLEY

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7 (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB): 266 lbs x SEISMIC FACTOR x DISTANCE TO MIDPOINT OF BANK (DRB) - 2646 ft-lbs SEISMIC MOMENT (WB) (FT, LBS.)
WEIGHT OF REAR BRACE (WFB): 47 lbs x SEISMIC FACTOR x DISTANCE TO MIDPOINT OF REAR BRACE (DRB) - 270 ft-lbs SEISMIC MOMENT (WFB) (FT, LBS.)
WEIGHT OF MAST (WM): 360 lbs x SEISMIC FACTOR x DISTANCE TO MIDPOINT OF MAST (DM) - 2033 ft-lbs SEISMIC MOMENT (WM) (FT, LBS.)

WB + WFB + WM = BACKSTOPS TOTAL WEIGHT LOAD

5148 ft-lbs SUM OF THE MOMENTS = WB + WFB + WM

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

REACTIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK DOWN $R_{ca}^{h}$ VERTICAL REACTIONS AT POINT A: 1054 lbs = WEIGHT LOAD AT POINT "A" / 2 SUPPORTS - SUM OF THE MOMENTS / DISTANCE BETWEEN SUPPORTS (A to A)

BANK DOWN $R_{ca}^{v}$ HORIZONTAL REACTION AT POINT A: 231 lbs = BACKSTOPS TOTAL WEIGHT LOAD x SEISMIC FACTOR / 2 SUPPORTS

REACTIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PERPENDICULAR TO BANK (FIG. 1)

BANK DOWN $R_{cb}^{h}$ VERTICAL REACTION AT POINT B: 444 lbs = WEIGHT OF REAR BRACE / 2 SUPPORTS - WEIGHT OF PULLEY / 2 SUPPORTS - SUM OF THE MOMENTS / DISTANCE BETWEEN SUPPORTS (A to B)

BANK DOWN $R_{cb}^{v}$ HORIZONTAL REACTION AT POINT B: 314 lbs = SUM OF THE MOMENTS / DISTANCE TO MIDPOINT OF REAR BRACE x 2

POI NT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOST CABLE TENSION AT POINT B: 549 lbs = SUM OF THE MOMENTS / SEISMIC FACTOR x DISTANCE FROM A TO B

REACTIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK UP $R_{ca}^{h}$ VERTICAL REACTION AT POINT A: 56 lbs = BACKSTOPS TOTAL WEIGHT LOAD - HOST CABLE TENSION / 2 SUPPORTS

BANK UP $R_{ca}^{v}$ HORIZONTAL REACTION AT POINT A: 726 lbs = SUM OF THE MOMENTS / DISTANCE FROM A TO A

REACTIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 1)

BANK UP $R_{cb}^{h}$ VERTICAL REACTION AT POINT B: 609 lbs = HOST CABLE TENSION / 2 SUPPORTS + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

BANK UP $R_{cb}^{v}$ HORIZONTAL REACTION AT POINT B: 549 lbs = HOST CABLE TENSION

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WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

**Backstop's Total Weight Load**

- \( 711 \text{ lbs} \) (Weight of Rear Brace + Weight of Mast + Weight of Bank)
- \( 676 \text{ lbs} \) (Weight of Rear Brace + Weight of Mast + Weight of Bank)
- \( 80 \text{ lbs} \) (Weight of Rear Brace + Weight of Pulley) + Weight of Pulley

**Seismic Factored Moments and Sum of Moments for Backstop Elements**

<table>
<thead>
<tr>
<th>Element</th>
<th>Weight</th>
<th>Seismic Factor</th>
<th>Sum of Moments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight of Bank (WB)</td>
<td>256 lbs x X</td>
<td>0.7</td>
<td>( 3031 \text{ lbs-ft} )</td>
</tr>
<tr>
<td>Weight of Rear Brace (WFB)</td>
<td>98 lbs x X</td>
<td>0.7</td>
<td>( 351 \text{ lbs-ft} )</td>
</tr>
<tr>
<td>Weight of Mast (WM)</td>
<td>150 lbs x X</td>
<td>0.7</td>
<td>( 2211 \text{ lbs-ft} )</td>
</tr>
</tbody>
</table>

**Reactions From Weight Loads and Seismic With Bank Down**

**Reactions at Hinge Line at Point A From Weight Loads and Seismic Parallel to Bank (Fig. 1)**

**Bank Down**

- Vertical Reaction at Point A: \( 119 \text{ lbs} \)
- Horizontal Reaction at Point A: \( 249 \text{ lbs} \)

**Reactions at Hinge Line at Point B From Weight Loads and Seismic Perpendicular to Bank (Fig. 1)**

**Bank Down**

- Vertical Reaction at Point B: \( 424 \text{ lbs} \)
- Horizontal Reaction at Point B: \( 314 \text{ lbs} \)

**Point Reactions From Weight Loads and Seismic With Bank Up**

**Reactions at Hinge Line at Point A From Weight Loads and Seismic Parallel to Bank (Fig. 2)**

**Bank Up**

- Vertical Reaction at Point A: \( 110 \text{ lbs} \)
- Horizontal Reaction at Point A: \( 629 \text{ lbs} \)

**Reactions at Hinge Line at Point B From Weight Loads and Seismic Parallel to Bank (Fig. 1)**

**Bank Up**

- Vertical Reaction at Point B: \( 571 \text{ lbs} \)
- Horizontal Reaction at Point B: \( 491 \text{ lbs} \)
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOPS TOTAL WEIGHT LOAD = 750 lbs (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK) + PLEASE NOTE THESE ARE ESTIMATED WEIGHT LOADS FROM THE BACKSTOP MAST HANGERS TO THE FLOOR. THESE ESTIMATES DO NOT INCLUDE ANY SUPERSTRUCTURE WEIGHTS.

WEIGHT LOAD AT POINT "A" = 714 lbs (WEIGHT OF REAR BRACE) + WEIGHT OF MAST + WEIGHT OF BANK
WEIGHT LOAD AT POINT "B" = 80 lbs (WEIGHT OF REAR BRACE) + WEIGHT OF PULLEY

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7 (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB) = 280 lbs x SEISMIC FACTOR x DISTANCE TO MIDPOINT OF BANK (DRB) = 3410 ft-lbs SEISMIC MOMENT (WB) (FT;LB)
WEIGHT OF REAR BRACE (WFR) = 88 lbs x SEISMIC FACTOR x DISTANCE TO MIDPOINT OF REAR BRACE (DRB) = 567 ft-lbs SEISMIC MOMENT (WFR) (FT;LB)
WEIGHT OF MAST (WM) = 360 lbs x SEISMIC FACTOR x DISTANCE TO MIDPOINT OF MAST (DM) = 2539 ft-lbs SEISMIC MOMENT (WM) (FT;LB)

WB + WFR + WM = BACKSTOPS TOTAL WEIGHT LOAD

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK DOWN

Vertical reaction at point A: 117 lbs = WEIGHT LOAD AT POINT "A" x SUM OF THE MOMENTS 2 SUPPORTS

Horizontal reaction at point A: 265 lbs = BACKSTOPS TOTAL WEIGHT LOAD x SEISMIC FACTOR

DISTANCE BETWEEN SUPPORTS (A->A) x 2

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PERPENDICULAR TO BANK (FIG. 1)

BANK DOWN

Vertical reaction at point B: 447 lbs = WEIGHT OF REAR BRACE x SUM OF THE MOMENTS 2 SUPPORTS

Horizontal reaction at point B: 36 lbs = SUM OF THE MOMENTS DISTANCE TO MIDPOINT OF REAR BRACE x 2

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOST CABLE TENSION AT POINT B: 523 lbs = SUM OF THE MOMENTS SEISMIC FACTOR x DISTANCE FROM A TO B

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK UP

Vertical reaction at point A: 117 lbs = BACKSTOPS TOTAL WEIGHT LOAD - HOST CABLE TENSION 2 SUPPORTS

Horizontal reaction at point A: 614 lbs = SUM OF THE MOMENTS DISTANCE FROM A TO A x 2

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 1)

BANK UP

Vertical reaction at point B: 603 lbs = HOST CABLE TENSION x SUM OF THE MOMENTS 2 SUPPORTS

Horizontal reaction at point B: 523 lbs = HOST CABLE TENSION
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOPS TOTAL WEIGHT LOAD = 774 lbs. (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK) + PLEASE NOTE THESE ARE ESTIMATED WEIGHT LOADS FROM THE BACKSTOP MAST HANGERS TO THE FLOOR. THESE ESTIMATES DO NOT INCLUDE ANY SUPERSTRUCTURE WEIGHTS.

WEIGHT LOAD AT POINT "A" = 727 lbs (WEIGHT OF REAR BRACE) / 2 + WEIGHT OF MAST + WEIGHT OF BANK

WEIGHT LOAD AT POINT "A" = 83 lbs (WEIGHT OF REAR BRACE) + WEIGHT OF PULLEY

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7 (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB) = 280 lbs x SEISMIC FACTOR X DISTANCE TO MIDPOINT OF BANK (DB)

WEIGHT OF REAR BRACE (WFR) = 94 lbs x SEISMIC FACTOR X DISTANCE TO MIDPOINT OF REAR BRACE (DRB)

WEIGHT OF MAST (WM) = 406 lbs x SEISMIC FACTOR X DISTANCE TO MIDPOINT OF MAST (DM)

- 3606 lbs SEISMIC MOMENT (WB) (FT-lbs.)
- 638 lbs SEISMIC MOMENT (WFR) (FT-lbs.)
- 2744 lbs SEISMIC MOMENT (WM) (FT-lbs.)

WB + WFR + WM = BACKSTOPS TOTAL WEIGHT LOAD

- 6868 lbs SUM OF THE MOMENTS = WB + WFR + WM

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK DOWN

Vertical Reaction at Point A: 123 lbs = WEIGHT LOAD AT POINT "A" / 2 SUPPORTS

Horizontal Reaction at Point A: 271 lbs = BACKSTOPS TOTAL WEIGHT LOAD X SEISMIC FACTOR / 2 SUPPORTS

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PERPENDICULAR TO BANK (FIG. 1)

BANK DOWN

Vertical Reaction at Point B: 455 lbs = WEIGHT OF REAR BRACE / 2 SUPPORTS + WEIGHT OF PULLEY

Horizontal Reaction at Point B: 360 lbs = SUM OF THE MOMENTS / DISTANCE TO MIDPOINT OF REAR BRACE X 2

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOIST CABLE TENSION AT POINT B: 531 lbs = SUM OF THE MOMENTS / SEISMIC FACTOR X DISTANCE FROM A TO B

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK UP

Vertical Reaction at Point A: 121 lbs = BACKSTOPS TOTAL WEIGHT LOAD - HOIST CABLE TENSION / 2 SUPPORTS

Horizontal Reaction at Point A: 873 lbs = SUM OF THE MOMENTS / DISTANCE FROM A TO A

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 1)

BANK UP

Vertical Reaction at Point B: 611 lbs = HOIST CABLE TENSION + WEIGHT OF REAR BRACE / 2 SUPPORTS + WEIGHT OF PULLEY

Horizontal Reaction at Point B: 531 lbs = HOIST CABLE TENSION

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WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOPS TOTAL WEIGHT LOAD = 791 lbs (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK) + PLEASE NOTE THESE ARE ESTIMATED WEIGHT LOADS FROM THE BACKSTOP MAST HANGERS TO THE FLOOR. THESE ESTIMATES DO NOT INCLUDE ANY SUPERSTRUCTURE WEIGHTS.

WEIGHT LOAD AT POINT "A" = 744 lbs (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK)

WEIGHT LOAD AT POINT "B" = 83 lbs (WEIGHT OF REAR BRACE + WEIGHT OF PULLEY)

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7 (VARYING WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB) = 286 lbs x SEISMIC FACTOR X DISTANCE TO MIDPOINT OF BANK (DB) = 3802 lbs SEISMIC MOMENT (WB) (FT lb)

WEIGHT OF MAST (WM) = 477 lbs x SEISMIC FACTOR X DISTANCE TO MIDPOINT OF MAST (DM) = 571 lbs SEISMIC MOMENT (WM) (FT lb)

WEIGHT OF BANK (WB) = 286 lbs x SEISMIC FACTOR X DISTANCE TO MIDPOINT OF BANK (DB) = 3802 lbs SEISMIC MOMENT (WB) (FT lb)

SUM OF THE MOMENTS = WB + VFB + WM

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK DOWN

Rc,x = VERTICAL REACTIONS AT POINT A: 125 lbs = WEIGHT LOAD AT POINT A + WEIGHT OF MAST + SUM OF THE MOMENTS

Rc,x = HORIZONTAL REACTION AT POINT A: 277 lbs = BACKSTOPS TOTAL WEIGHT LOAD X SEISMIC FACTOR

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PERPENDICULAR TO BANK (FIG. 1)

BANK DOWN

Rc,x = VERTICAL REACTION AT POINT B: 461 lbs = WEIGHT OF REAR BRACE + WEIGHT OF PULLEY + SUM OF THE MOMENTS

Rc,x = HORIZONTAL REACTION AT POINT B: 367 lbs = SUM OF THE MOMENTS

DISTANCE TO MIDPOINT OF REAR BRACE X 2

REATIONS AT HINGE LINE AT POINT A FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 2)

BANK UP

Rc,x = VERTICAL REACTIONS AT POINT A: 125 lbs = BACKSTOPS TOTAL WEIGHT LOAD - HOIST CABLE TENSION + SUM OF THE MOMENTS

Rc,x = HORIZONTAL REACTION AT POINT A: 925 lbs = SUM OF THE MOMENTS

DISTANCE FROM A TO A

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PARALLEL TO BANK (FIG. 1)

BANK UP

Rc,x = VERTICAL REACTION AT POINT B: 623 lbs = HOIST CABLE TENSION + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

Rc,x = HORIZONTAL REACTION AT POINT B: 540 lbs = HOIST CABLE TENSION