

STATIC EQUIVALENT LOADING: 955 STYLE BACKSTOP

CEILING SUSPENDED, SIDE FOLD, SIDE BRACED

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:

[19' Attachment Height](#)

[24' Attachment Height](#)

[29' Attachment Height](#)

[20' Attachment Height](#)

[25' Attachment Height](#)

[30' Attachment Height](#)

[21' Attachment Height](#)

[26' Attachment Height](#)

[31' Attachment Height](#)

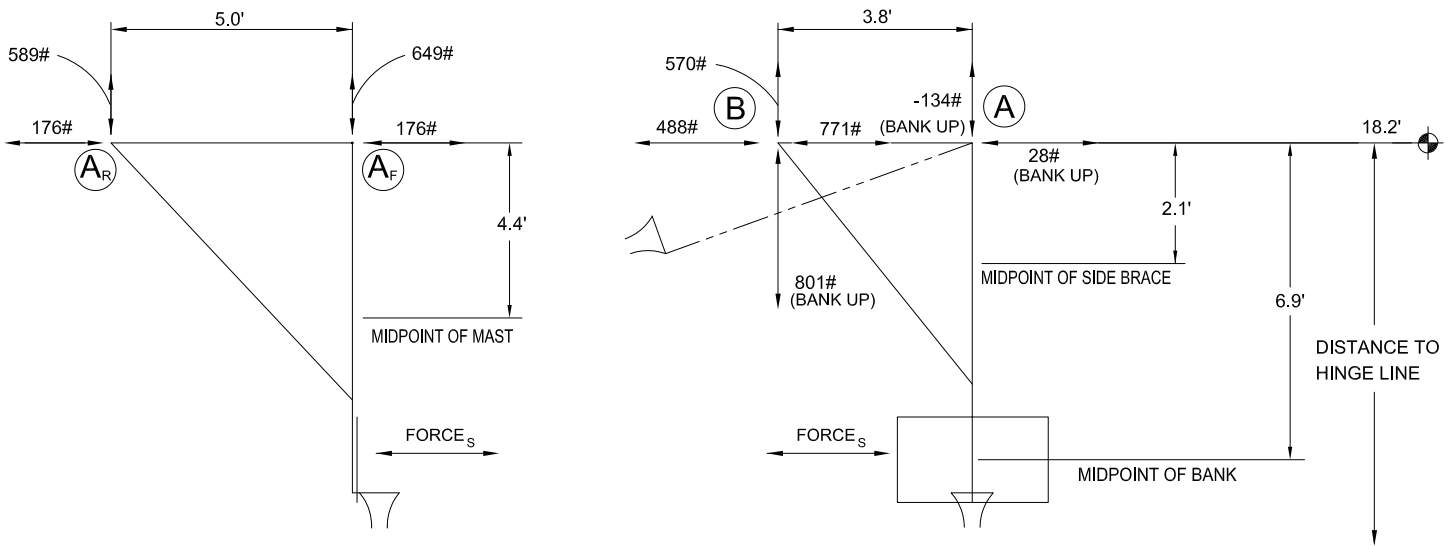
[22' Attachment Height](#)

[27' Attachment Height](#)

[32' Attachment Height](#)

[23' Attachment Height](#)

[28' Attachment Height](#)



FORCES PERPENDICULAR TO BANK FIGURE 1

FORCES PARALLEL TO BANK FIGURE 2

WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

$$\begin{aligned} \text{BACKSTOP'S TOTAL WEIGHT LOAD} &= 504 \text{ lbs (WEIGHT OF FRONT BRACE + WEIGHT OF MAST + WEIGHT OF BANK)} \\ \text{WEIGHT LOAD AT POINT "A"} &= 480 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} \\ \text{WEIGHT LOAD AT POINT "B"} &= 30 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF PULLEY} \end{aligned}$$

+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)

$$\begin{aligned} \text{WEIGHT OF BANK (WB)} &= 329 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF BANK (DB)} = 1589 \text{ ft.lbs SEISMIC MOMENT (MB) (FT.LBS.)} \\ \text{WEIGHT OF SIDE BRACE (WSB)} &= 48 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF SIDE BRACE (DSB)} = 71 \text{ ft.lbs SEISMIC MOMENT (MFB) (FT.LBS.)} \\ \text{WEIGHT OF MAST (WM)} &= 127 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF MAST (DM)} = 391 \text{ ft.lbs SEISMIC MOMENT (MM) (FT.LBS.)} \end{aligned}$$

$$\text{WB} + \text{WFB} + \text{WM} = \text{BACKSTOP'S TOTAL WEIGHT LOAD} = 2051 \text{ ft.lbs} \quad \text{SUM OF THE MOMENTS} = \text{MB} + \text{MFB} + \text{MM}$$

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)

$$\begin{aligned} \text{BANK DOWN} \quad R_{\text{VER}}^{\text{AR}} \quad \text{VERTICAL REACTIONS AT POINT AF:} \quad 649 \text{ lbs} &= \frac{\text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} + \frac{\text{WEIGHT OF THE BANK}}{2 \text{ SUPPORTS}}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \\ R_{\text{VER}}^{\text{AF}} \quad \text{VERTICAL REACTIONS AT POINT AR:} \quad 598 \text{ lbs} &= \frac{\text{WEIGHT OF BANK}}{2 \text{ SUPPORTS}} + \frac{\text{MOMENT AT MAST} + \text{MOMENT AT BANK}}{\text{DISTANCE BETWEEN SUPPORTS (A}_F - \text{A}_R)} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \\ R_{\text{HOR}} \quad \text{HORIZONTAL REACTION FOR BOTH:} \quad 176 \text{ lbs} &= \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} \times \text{SEISMIC FACTOR}}{2 \text{ SUPPORTS}} \end{aligned}$$

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

$$\begin{aligned} \text{BANK DOWN} \quad R_{\text{VER}}^{\text{B}} \quad \text{VERTICAL REACTION AT POINT B:} \quad 570 \text{ lbs} &= \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \pm \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE BETWEEN SUPPORTS (A-B)}} \\ R_{\text{HOR}}^{\text{B}} \quad \text{HORIZONTAL REACTION AT POINT B:} \quad 488 \text{ lbs} &= \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE TO MIDPOINT OF SIDE BRACE} \times 2} \end{aligned}$$

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

$$\text{HOIST CABLE TENSION AT POINT C:} \quad 771 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{SEISMIC FACTOR} \times \text{DISTANCE FROM A TO B}}$$

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

$$\begin{aligned} \text{BANK UP} \quad R_{\text{VER}}^{\text{A-BU}} \quad \text{VERTICAL REACTION AT POINT A:} \quad -134 \text{ lbs} &= \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} - \text{HOIST CABLE TENSION}}{2 \text{ SUPPORTS}} \\ R_{\text{HOR}}^{\text{AF}} \quad \text{HORIZONTAL REACTION AT POINT A: FROM SEISMIC PARALLEL TO BANK} \quad 28 \text{ lbs} &= \pm \frac{\text{MOMENT AT BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \end{aligned}$$

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

$$\begin{aligned} \text{BANK UP} \quad R_{\text{VER}}^{\text{B-BU}} \quad \text{VERTICAL REACTION AT POINT B:} \quad 801 \text{ lbs} &= \text{HOIST CABLE TENSION} + \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \\ R_{\text{HOR}}^{\text{B-BU}} \quad \text{HORIZONTAL REACTION AT POINT B:} \quad 771 \text{ lbs} &= \text{HOIST CABLE TENSION} \end{aligned}$$



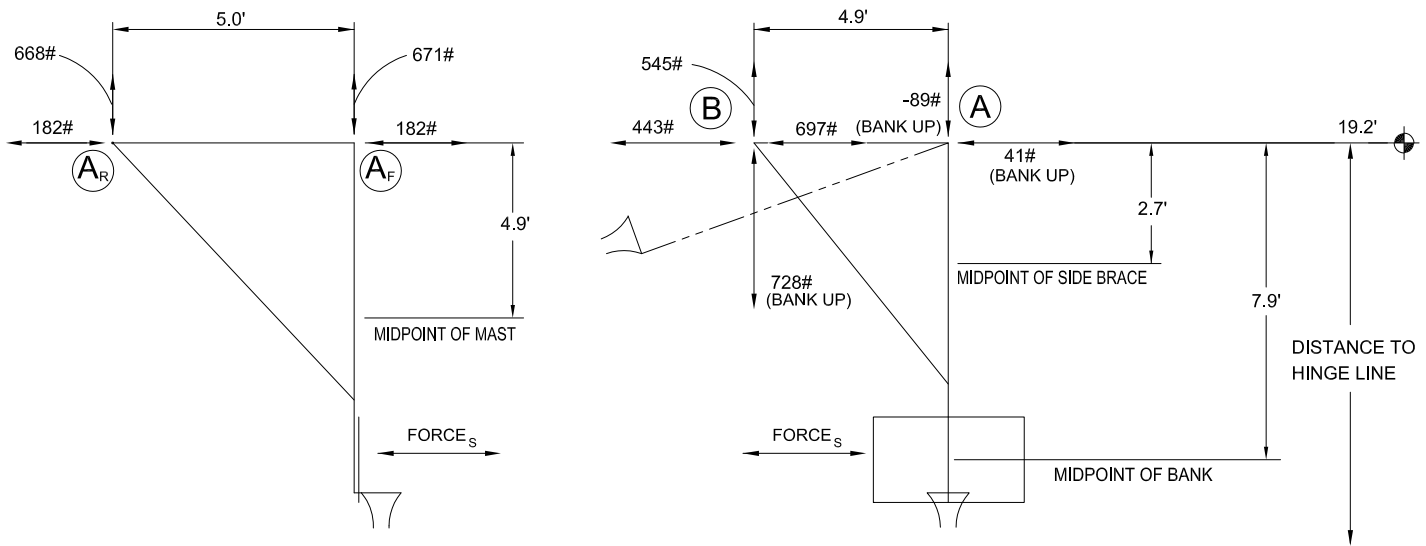
REVISION	DATE	PORTER No.
A	-	-
B	-	CUSTOMER No.
C	-	-
DATE		9/21/2011

STATIC EQUIVALENT LOADING FOR:
955 Style Back Braced Backstop
19' Attachment Height

THIS PRINT IS THE PROPERTY OF PORTER ATHLETIC EQUIPMENT COMPANY AND MAY NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION

porter
WORLD LEADER
IN QUALITY SPORTS EQUIPMENT
2500 S. 25th AVENUE
BROADVIEW, ILLINOIS 60155
www.porter-ath.com

DRAWING BY
Mfigueroa
CHECKED BY
GS
PAGE No.



FORCES PERPENDICULAR TO BANK FIGURE 1

FORCES PARALLEL TO BANK FIGURE 2

WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

$$\begin{aligned} \text{BACKSTOP'S TOTAL WEIGHT LOAD} &= 520 \text{ lbs (WEIGHT OF FRONT BRACE + WEIGHT OF MAST + WEIGHT OF BANK)} \\ \text{WEIGHT LOAD AT POINT "A"} &= 493 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} \\ \text{WEIGHT LOAD AT POINT "B"} &= 33 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF PULLEY} \end{aligned}$$

+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)

$$\begin{aligned} \text{WEIGHT OF BANK (WB)} &= 329 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF BANK (DB)} = 1819 \text{ ft.lbs SEISMIC MOMENT (MB) (FT.LBS.)} \\ \text{WEIGHT OF SIDE BRACE (WSB)} &= 54 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF SIDE BRACE (DSB)} = 102 \text{ ft.lbs SEISMIC MOMENT (MFB) (FT.LBS.)} \\ \text{WEIGHT OF MAST (WM)} &= 137 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF MAST (DM)} = 470 \text{ ft.lbs SEISMIC MOMENT (MM) (FT.LBS.)} \end{aligned}$$

$$\text{WB} + \text{WFB} + \text{WM} = \text{BACKSTOP'S TOTAL WEIGHT LOAD} = 2391 \text{ ft.lbs SUM OF THE MOMENTS} = \text{MB} + \text{MFB} + \text{MM}$$

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)

$$\begin{aligned} \text{BANK DOWN} \quad R_{\text{VER}}^{\text{AR}} \quad \text{VERTICAL REACTIONS AT POINT AF:} \quad 671 \text{ lbs} &= \frac{\text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} + \frac{\text{WEIGHT OF THE BANK}}{2 \text{ SUPPORTS}} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \\ R_{\text{VER}}^{\text{AF}} \quad \text{VERTICAL REACTIONS AT POINT AR:} \quad 668 \text{ lbs} &= \frac{\text{WEIGHT OF BANK}}{2 \text{ SUPPORTS}} + \frac{\text{MOMENT AT MAST} + \text{MOMENT AT BANK}}{\text{DISTANCE BETWEEN SUPPORTS (A}_F - \text{A}_R)} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \\ R_{\text{HOR}} \quad \text{HORIZONTAL REACTION FOR BOTH:} \quad 182 \text{ lbs} &= \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} \times \text{SEISMIC FACTOR}}{2 \text{ SUPPORTS}} \end{aligned}$$

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

$$\begin{aligned} \text{BANK DOWN} \quad R_{\text{VER}}^{\text{B}} \quad \text{VERTICAL REACTION AT POINT B:} \quad 545 \text{ lbs} &= \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \pm \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE BETWEEN SUPPORTS (A-B)}} \\ R_{\text{HOR}}^{\text{B}} \quad \text{HORIZONTAL REACTION AT POINT B:} \quad 443 \text{ lbs} &= \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE TO MIDPOINT OF SIDE BRACE} \times 2} \end{aligned}$$

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

$$\text{HOIST CABLE TENSION AT POINT C:} \quad 697 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{SEISMIC FACTOR} \times \text{DISTANCE FROM A TO B}}$$

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

$$\begin{aligned} \text{BANK UP} \quad R_{\text{VER}}^{\text{A-BU}} \quad \text{VERTICAL REACTION AT POINT A:} \quad -89 \text{ lbs} &= \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} - \text{HOIST CABLE TENSION}}{2 \text{ SUPPORTS}} \\ R_{\text{HOR}}^{\text{AF}} \quad \text{HORIZONTAL REACTION AT POINT A: FROM SEISMIC PARALLEL TO BANK} \quad 41 \text{ lbs} &= \pm \frac{\text{MOMENT AT BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \end{aligned}$$

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

$$\begin{aligned} \text{BANK UP} \quad R_{\text{VER}}^{\text{B-BU}} \quad \text{VERTICAL REACTION AT POINT B:} \quad 728 \text{ lbs} &= \text{HOIST CABLE TENSION} + \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \\ R_{\text{HOR}}^{\text{B-BU}} \quad \text{HORIZONTAL REACTION AT POINT B:} \quad 697 \text{ lbs} &= \text{HOIST CABLE TENSION} \end{aligned}$$



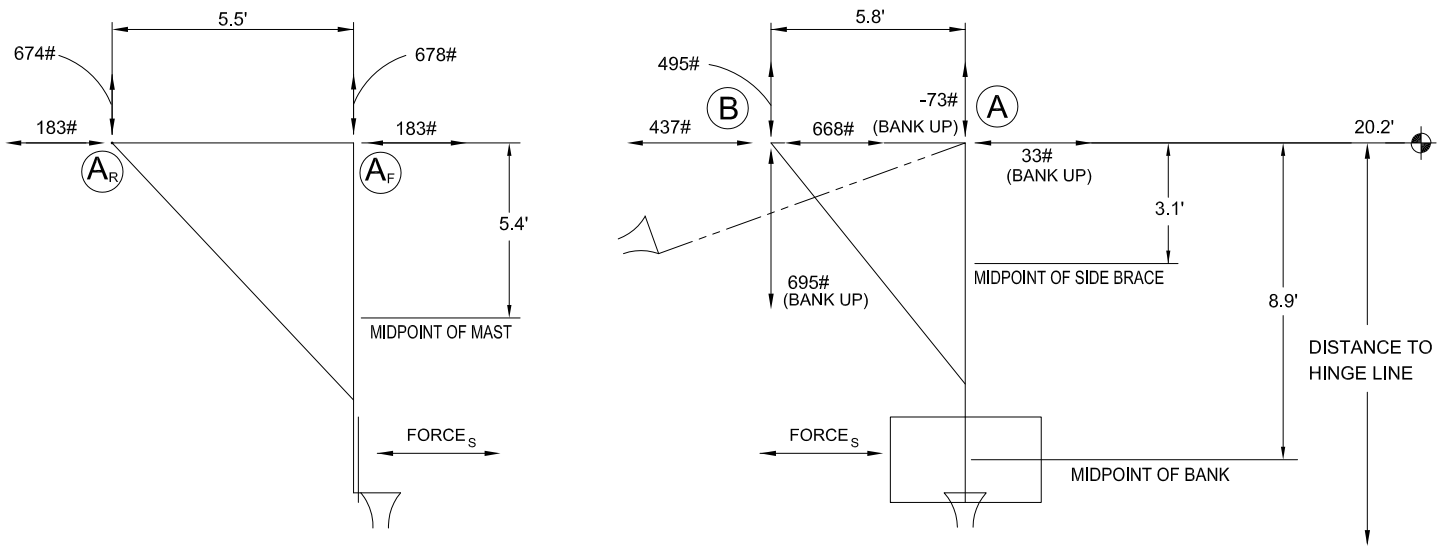
REVISION	DATE	PORTER No.
A	-	-
B	-	CUSTOMER No.
C	-	-
DATE		9/21/2011

STATIC EQUIVALENT LOADING FOR:
955 Style backstop
20' Attachment Height

THIS PRINT IS THE PROPERTY OF PORTER ATHLETIC EQUIPMENT COMPANY AND MAY NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION

porter
WORLD LEADER
IN QUALITY SPORTS EQUIPMENT
2500 S. 25th AVENUE
BROADVIEW, ILLINOIS 60155
www.porter-ath.com

DRAWING BY
Migueroa
CHECKED BY
GS
PAGE No.



WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

$$\begin{aligned} \text{BACKSTOP'S TOTAL WEIGHT LOAD} &= 522 \text{ lbs (WEIGHT OF FRONT BRACE + WEIGHT OF MAST + WEIGHT OF BANK)} \\ \text{WEIGHT LOAD AT POINT "A"} &= 506 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} \\ \text{WEIGHT LOAD AT POINT "B"} &= 27 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF PULLEY} \end{aligned}$$

+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)

$$\begin{aligned} \text{WEIGHT OF BANK (WB)} &= 329 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF BANK (DB)} = 2050 \text{ ft.lbs SEISMIC MOMENT (MB) (FT.LBS.)} \\ \text{WEIGHT OF SIDE BRACE (WSB)} &= 42 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF SIDE BRACE (DSB)} = 91 \text{ ft.lbs SEISMIC MOMENT (MFB) (FT.LBS.)} \\ \text{WEIGHT OF MAST (WM)} &= 151 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF MAST (DM)} = 571 \text{ ft.lbs SEISMIC MOMENT (MM) (FT.LBS.)} \end{aligned}$$

$$\text{WB} + \text{WFB} + \text{WM} = \text{BACKSTOP'S TOTAL WEIGHT LOAD} = 2712 \text{ ft.lbs} \quad \text{SUM OF THE MOMENTS} = \text{MB} + \text{MFB} + \text{MM}$$

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

$$\begin{aligned} R_{\text{VER}}^{\text{AR}} & \text{ VERTICAL REACTIONS AT POINT AF: } 678 \text{ lbs} = \frac{\text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} + \frac{\text{WEIGHT OF THE BANK}}{2 \text{ SUPPORTS}}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \\ R_{\text{VER}}^{\text{AF}} & \text{ VERTICAL REACTIONS AT POINT AR: } 674 \text{ lbs} = \frac{\text{WEIGHT OF BANK}}{2 \text{ SUPPORTS}} + \frac{\text{MOMENT AT MAST} + \text{MOMENT AT BANK}}{\text{DISTANCE BETWEEN SUPPORTS (A}_F - \text{A}_R)} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \\ R_{\text{HOR}} & \text{ HORIZONTAL REACTION FOR BOTH: } 183 \text{ lbs} = \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} \times \text{SEISMIC FACTOR}}{2 \text{ SUPPORTS}} \end{aligned}$$

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

BANK DOWN

$$\begin{aligned} R_{\text{VER}}^{\text{B}} & \text{ VERTICAL REACTION AT POINT B: } 495 \text{ lbs} = \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \pm \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE BETWEEN SUPPORTS (A-B)}} \\ R_{\text{HOR}}^{\text{B}} & \text{ HORIZONTAL REACTION AT POINT B: } 437 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE TO MIDPOINT OF SIDE BRACE} \times 2} \end{aligned}$$

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

$$\text{HOIST CABLE TENSION AT POINT C: } 668 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{SEISMIC FACTOR} \times \text{DISTANCE FROM A TO B}}$$

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

BANK UP

$$\begin{aligned} R_{\text{VER}}^{\text{A-BU}} & \text{ VERTICAL REACTION AT POINT A: } -73 \text{ lbs} = \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} - \text{HOIST CABLE TENSION}}{2 \text{ SUPPORTS}} \\ R_{\text{HOR}}^{\text{AF}} & \text{ HORIZONTAL REACTION AT POINT A: FROM SEISMIC PARALLEL TO BANK } 33 \text{ lbs} = \pm \frac{\text{MOMENT AT BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \end{aligned}$$

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

BANK UP

$$\begin{aligned} R_{\text{VER}}^{\text{B-BU}} & \text{ VERTICAL REACTION AT POINT B: } 695 \text{ lbs} = \text{HOIST CABLE TENSION} + \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \\ R_{\text{HOR}}^{\text{B-BU}} & \text{ HORIZONTAL REACTION AT POINT B: } 668 \text{ lbs} = \text{HOIST CABLE TENSION} \end{aligned}$$



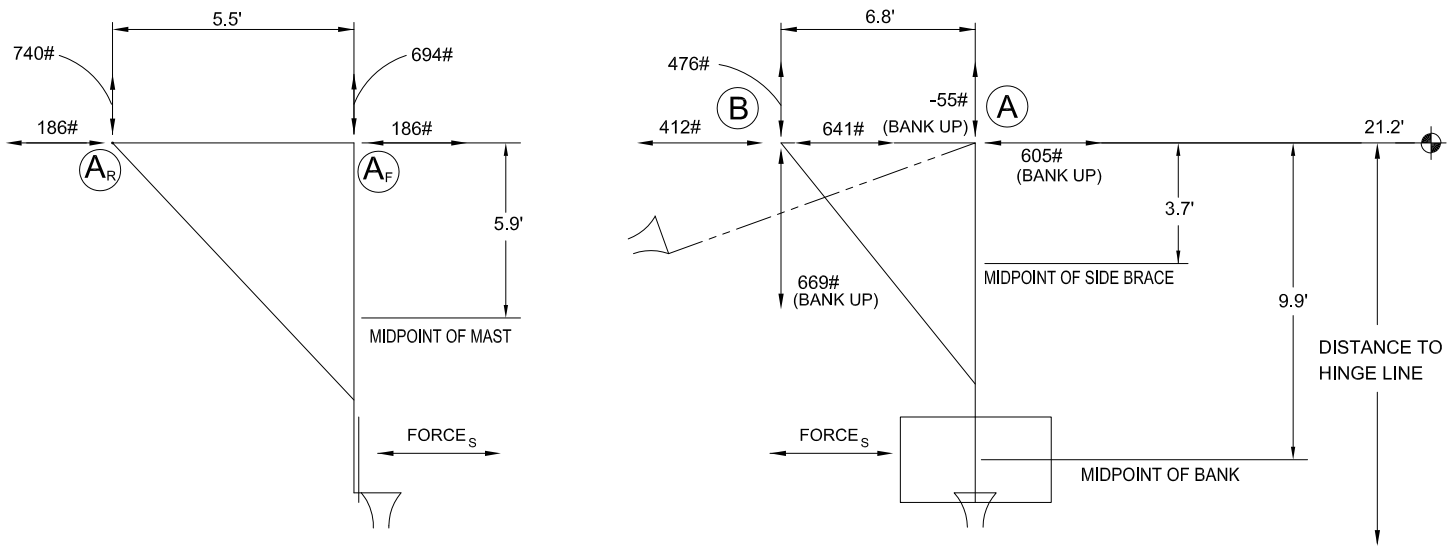
REVISION	DATE	PORTER No.
A	-	-
B	-	CUSTOMER No.
C	-	-
DATE		9/21/2011

STATIC EQUIVALENT LOADING FOR:
955 Style Back Braced Backstop
21' Attachment Height

THIS PRINT IS THE PROPERTY OF PORTER ATHLETIC EQUIPMENT COMPANY AND MAY NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION

porter
WORLD LEADER
IN QUALITY SPORTS EQUIPMENT
2500 S. 25th AVENUE
BROADVIEW, ILLINOIS 60155
www.porter-ath.com

DRAWING BY	Migueroa
CHECKED BY	GS
PAGE No.	



FORCES PERPENDICULAR TO BANK FIGURE 1

FORCES PARALLEL TO BANK FIGURE 2

WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD = 532 lbs (WEIGHT OF FRONT BRACE + WEIGHT OF MAST + WEIGHT OF BANK)

WEIGHT LOAD AT POINT "A" = $511 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK}$

WEIGHT LOAD AT POINT "B" = $28 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF PULLEY}$

+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 (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB)	329 lbs	X SEISMIC FACTOR	X	DISTANCE TO MIDPOINT OF BANK (DB)	=	2280 ft.lbs	SEISMIC MOMENT (MB) (FT.LBS.)
WEIGHT OF SIDE BRACE (WSB)	43 lbs	X SEISMIC FACTOR	X	DISTANCE TO MIDPOINT OF SIDE BRACE (DSB)	=	111 ft.lbs	SEISMIC MOMENT (MFB) (FT.LBS.)
WEIGHT OF MAST (WM)	160 lbs	X SEISMIC FACTOR	X	DISTANCE TO MIDPOINT OF MAST (DM)	=	661 ft.lbs	SEISMIC MOMENT (MM) (FT.LBS.)

WB + WFB + WM = BACKSTOP'S TOTAL WEIGHT LOAD = 3052 ft.lbs SUM OF THE MOMENTS = MB + MFB + MM

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_{VER}^{AR} VERTICAL REACTIONS AT POINT AF: $694 \text{ lbs} = \frac{\text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} + \frac{\text{WEIGHT OF THE BANK}}{2 \text{ SUPPORTS}}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

R_{VER}^{AF} VERTICAL REACTIONS AT POINT AR: $740 \text{ lbs} = \frac{\text{WEIGHT OF BANK}}{2 \text{ SUPPORTS}} + \frac{\text{MOMENT AT MAST} + \text{MOMENT AT BANK}}{\text{DISTANCE BETWEEN SUPPORTS } (A_F - A_R)} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

R_{HOR} HORIZONTAL REACTION FOR BOTH: $186 \text{ lbs} = \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} \times \text{SEISMIC FACTOR}}{2 \text{ SUPPORTS}}$

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

BANK DOWN

R_{VER}^B VERTICAL REACTION AT POINT B: $476 \text{ lbs} = \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \pm \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE BETWEEN SUPPORTS } (A-B)}$

R_{HOR}^B HORIZONTAL REACTION AT POINT B: $412 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE TO MIDPOINT OF SIDE BRACE} \times 2}$

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOIST CABLE TENSION AT POINT C: $641 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{SEISMIC FACTOR} \times \text{DISTANCE FROM A TO B}}$

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

BANK UP

R_{VER}^{A-BU} VERTICAL REACTION AT POINT A: $-55 \text{ lbs} = \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} - \text{HOIST CABLE TENSION}}{2 \text{ SUPPORTS}}$

R_{HOR}^{AF} HORIZONTAL REACTION AT POINT A: $40 \text{ lbs} = \pm \frac{\text{MOMENT AT BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

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

BANK UP

R_{VER}^{B-BU} VERTICAL REACTION AT POINT B: $669 \text{ lbs} = \text{HOIST CABLE TENSION} + \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY}$

R_{HOR}^{B-BU} HORIZONTAL REACTION AT POINT B: $641 \text{ lbs} = \text{HOIST CABLE TENSION}$



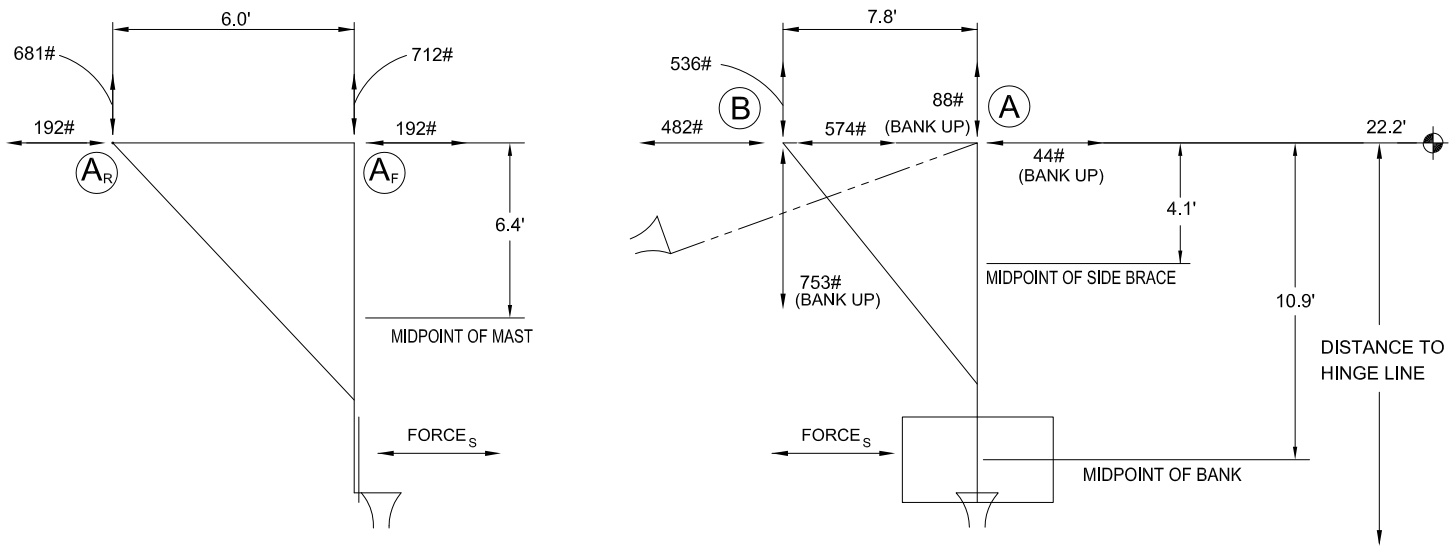
REVISION	DATE	PORTER No.
A	-	-
B	-	CUSTOMER No.
C	-	-
DATE		9/21/2011

STATIC EQUIVALENT LOADING FOR:
955 Style Back Braced Backstop
22' Attachment Height

THIS PRINT IS THE PROPERTY OF PORTER ATHLETIC EQUIPMENT COMPANY AND MAY NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION

porter
WORLD LEADER
IN QUALITY SPORTS EQUIPMENT
2500 S. 25th AVENUE
BROADVIEW, ILLINOIS 60155
www.porter-ath.com

DRAWING BY	Migueroa
CHECKED BY	GS
PAGE No.	



FORCES PERPENDICULAR TO BANK FIGURE 1

FORCES PARALLEL TO BANK FIGURE 2

WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

$$\begin{aligned} \text{BACKSTOP'S TOTAL WEIGHT LOAD} &= 549 \text{ lbs (WEIGHT OF FRONT BRACE + WEIGHT OF MAST + WEIGHT OF BANK)} \\ \text{WEIGHT LOAD AT POINT "A"} &= 526 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} \\ \text{WEIGHT LOAD AT POINT "B"} &= 29 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF PULLEY} \end{aligned}$$

+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)

$$\begin{aligned} \text{WEIGHT OF BANK (WB)} &= 329 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF BANK (DB)} = 2510 \text{ ft.lbs SEISMIC MOMENT (MB) (FT.LBS.)} \\ \text{WEIGHT OF SIDE BRACE (WSB)} &= 46 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF SIDE BRACE (DSB)} = 132 \text{ ft.lbs SEISMIC MOMENT (MFB) (FT.LBS.)} \\ \text{WEIGHT OF MAST (WM)} &= 174 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF MAST (DM)} = 1309 \text{ ft.lbs SEISMIC MOMENT (MM) (FT.LBS.)} \end{aligned}$$

$$\text{WB} + \text{WFB} + \text{WM} = \text{BACKSTOP'S TOTAL WEIGHT LOAD} = 3951 \text{ ft.lbs SUM OF THE MOMENTS} = \text{MB} + \text{MFB} + \text{MM}$$

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

$$\begin{aligned} R_{\text{VER}}^{\text{AR}} & \text{ VERTICAL REACTIONS AT POINT AF: } 712 \text{ lbs} = \frac{\text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} + \frac{\text{WEIGHT OF THE BANK}}{2 \text{ SUPPORTS}} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \\ R_{\text{VER}}^{\text{AF}} & \text{ VERTICAL REACTIONS AT POINT AR: } 681 \text{ lbs} = \frac{\text{WEIGHT OF BANK}}{2 \text{ SUPPORTS}} + \frac{\text{MOMENT AT MAST} + \text{MOMENT AT BANK}}{\text{DISTANCE BETWEEN SUPPORTS (A}_F - \text{A}_R)} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \\ R_{\text{HOR}} & \text{ HORIZONTAL REACTION FOR BOTH: } 192 \text{ lbs} = \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} \times \text{SEISMIC FACTOR}}{2 \text{ SUPPORTS}} \end{aligned}$$

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

BANK DOWN

$$\begin{aligned} R_{\text{VER}}^{\text{B}} & \text{ VERTICAL REACTION AT POINT B: } 536 \text{ lbs} = \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \pm \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE BETWEEN SUPPORTS (A-B)}} \\ R_{\text{HOR}}^{\text{B}} & \text{ HORIZONTAL REACTION AT POINT B: } 482 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE TO MIDPOINT OF SIDE BRACE} \times 2} \end{aligned}$$

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

$$\text{HOIST CABLE TENSION AT POINT C: } 724 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{SEISMIC FACTOR} \times \text{DISTANCE FROM A TO B}}$$

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

BANK UP

$$\begin{aligned} R_{\text{VER}}^{\text{A-BU}} & \text{ VERTICAL REACTION AT POINT A: } 88 \text{ lbs} = \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} - \text{HOIST CABLE TENSION}}{2 \text{ SUPPORTS}} \\ R_{\text{HOR}}^{\text{AF}} & \text{ HORIZONTAL REACTION AT POINT A: FROM SEISMIC PARALLEL TO BANK } 44 \text{ lbs} = \pm \frac{\text{MOMENT AT BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \end{aligned}$$

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

BANK UP

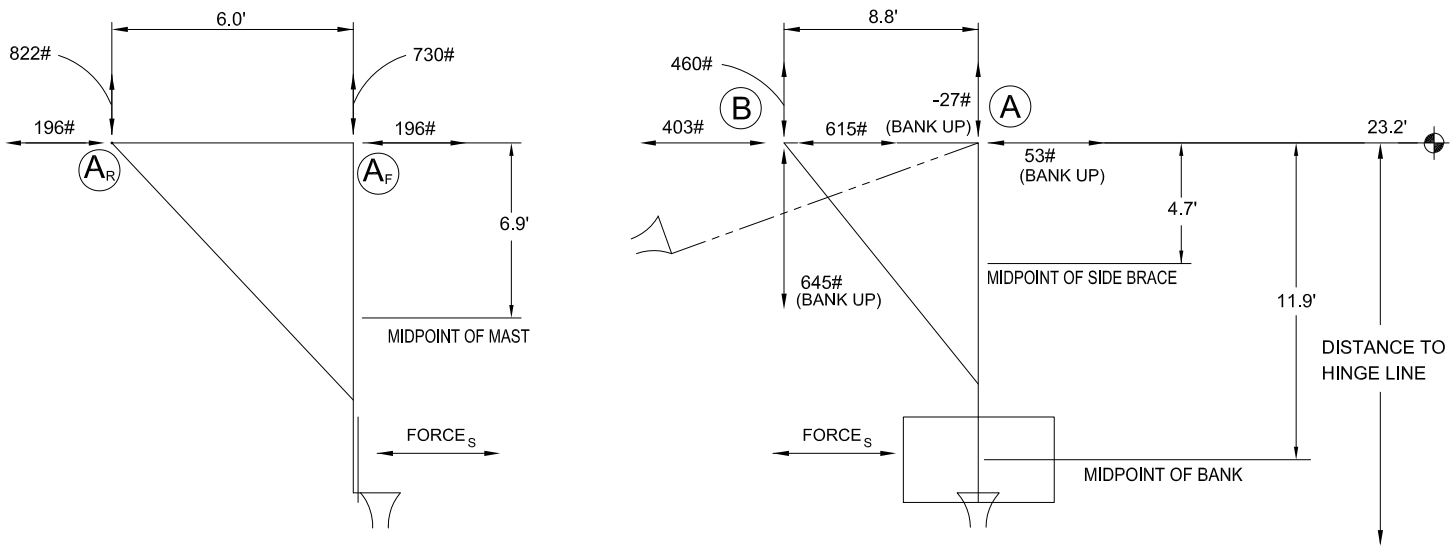
$$\begin{aligned} R_{\text{VER}}^{\text{B-BU}} & \text{ VERTICAL REACTION AT POINT B: } 753 \text{ lbs} = \text{HOIST CABLE TENSION} + \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \\ R_{\text{HOR}}^{\text{B-BU}} & \text{ HORIZONTAL REACTION AT POINT B: } 724 \text{ lbs} = \text{HOIST CABLE TENSION} \end{aligned}$$



REVISION	DATE	PORTER No.
A	-	-
B	-	CUSTOMER No.
C	-	-
DATE		9/21/2011

STATIC EQUIVALENT LOADING FOR: 955 Style Back Braced Backstop 23' Attachment Height	
<small>THIS PRINT IS THE PROPERTY OF PORTER ATHLETIC EQUIPMENT COMPANY AND MAY NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION</small>	

porter <small>WORLD LEADER IN QUALITY SPORTS EQUIPMENT 2500 S. 25th AVENUE BROADVIEW, ILLINOIS 60155 www.porter-ath.com</small>	DRAWING BY Mfigueroa CHECKED BY GS PAGE No.
---	--



WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD	=	561 lbs (WEIGHT OF FRONT BRACE + WEIGHT OF MAST + WEIGHT OF BANK)
WEIGHT LOAD AT POINT "A" =		537 lbs $\left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK}$
WEIGHT LOAD AT POINT "B" =		30 lbs $\left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF PULLEY}$

+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 (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB)	329 lbs	X SEISMIC FACTOR	X	DISTANCE TO MIDPOINT OF BANK (DB)	=	2741 ft.lbs	SEISMIC MOMENT (MB) (FT.LBS.)
WEIGHT OF SIDE BRACE (WSB)	48 lbs	X SEISMIC FACTOR	X	DISTANCE TO MIDPOINT OF SIDE BRACE (DSB)	=	158 ft.lbs	SEISMIC MOMENT (MFB) (FT.LBS.)
WEIGHT OF MAST (WM)	184 lbs	X SEISMIC FACTOR	X	DISTANCE TO MIDPOINT OF MAST (DM)	=	808 ft.lbs	SEISMIC MOMENT (MM) (FT.LBS.)

WB + WFB + WM = BACKSTOP'S TOTAL WEIGHT LOAD = 3788 ft.lbs SUM OF THE MOMENTS = MB + MFB + MM

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_{VER}^{AR}	VERTICAL REACTIONS AT POINT AF:	730 lbs =	$\frac{\text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} + \frac{\text{WEIGHT OF THE BANK}}{2 \text{ SUPPORTS}}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$
	R_{VER}^{AF}	VERTICAL REACTIONS AT POINT AR:	822 lbs =	$\frac{\text{WEIGHT OF BANK}}{2 \text{ SUPPORTS}} + \frac{\text{MOMENT AT MAST} + \text{MOMENT AT BANK}}{\text{DISTANCE BETWEEN SUPPORTS } (A_F - A_R)} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$
	R_{HOR}	HORIZONTAL REACTION FOR BOTH:	196 lbs =	$\frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} \times \text{SEISMIC FACTOR}}{2 \text{ SUPPORTS}}$

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

BANK DOWN	R_{VER}^B	VERTICAL REACTION AT POINT B:	460 lbs =	$\frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \pm \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE BETWEEN SUPPORTS } (A-B)}$
	R_{HOR}^B	HORIZONTAL REACTION AT POINT B:	403 lbs =	$\frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE TO MIDPOINT OF SIDE BRACE} \times 2}$

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOIST CABLE TENSION AT POINT C: 615 lbs = $\frac{\text{SUM OF THE MOMENTS}}{\text{SEISMIC FACTOR} \times \text{DISTANCE FROM A TO B}}$

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

BANK UP	R_{VER}^{A-BU}	VERTICAL REACTION AT POINT A:	-27 lbs =	$\frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} - \text{HOIST CABLE TENSION}}{2 \text{ SUPPORTS}}$
	R_{HOR}^{AF}	HORIZONTAL REACTION AT POINT A: FROM SEISMIC PARALLEL TO BANK	53 lbs =	$\pm \frac{\text{MOMENT AT BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

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

BANK UP	R_{VER}^{B-BU}	VERTICAL REACTION AT POINT B:	645 lbs =	$\text{HOIST CABLE TENSION} + \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY}$
	R_{HOR}^{B-BU}	HORIZONTAL REACTION AT POINT B:	615 lbs =	HOIST CABLE TENSION



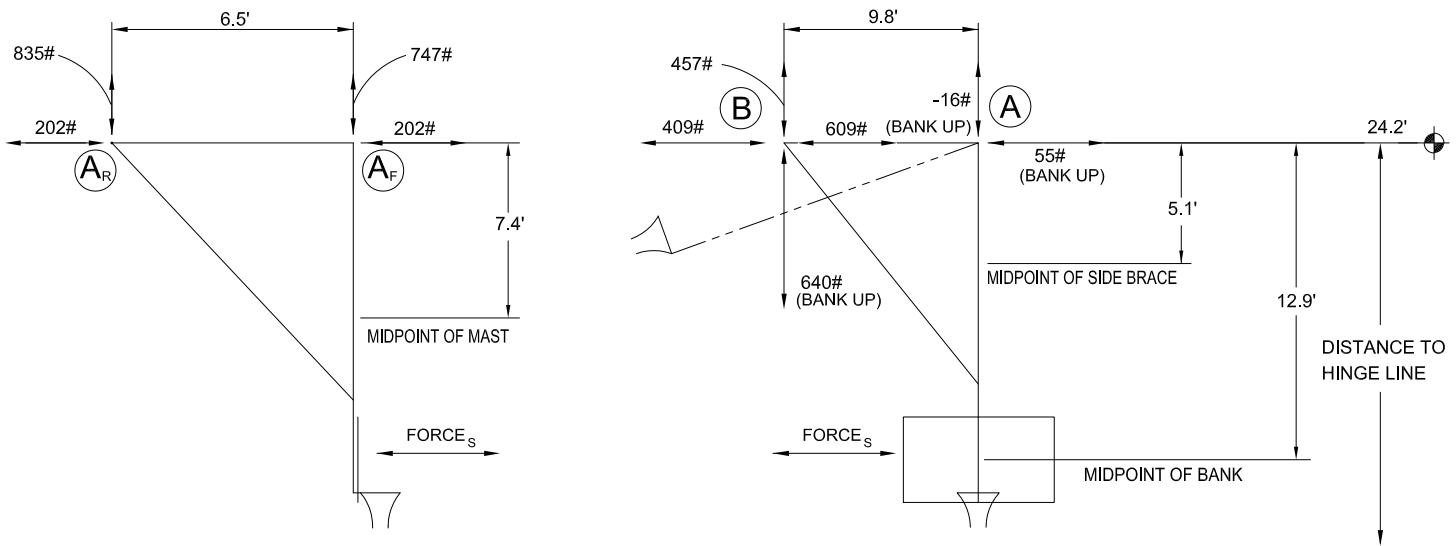
REVISION	DATE	Porter No.
A	-	-
B	-	CUSTOMER No.
C	-	-
DATE		9/21/2011

STATIC EQUIVALENT LOADING FOR:
955 Style Back Braced Backstop
24' Attachment Height

THIS PRINT IS THE PROPERTY OF PORTER ATHLETIC EQUIPMENT COMPANY AND MAY NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION

porter
WORLD LEADER
IN QUALITY SPORTS EQUIPMENT
2500 S. 25th AVENUE
BROADVIEW, ILLINOIS 60155
www.porter-ath.com

DRAWING BY	Mfigueroa
CHECKED BY	GS
PAGE No.	



WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD = 577 lbs (WEIGHT OF FRONT BRACE + WEIGHT OF MAST + WEIGHT OF BANK)

WEIGHT LOAD AT POINT "A" = $552 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK}$

WEIGHT LOAD AT POINT "B" = $31 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF PULLEY}$

+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 (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB)	329 lbs	X SEISMIC FACTOR X	DISTANCE TO MIDPOINT OF BANK (DB)	=	2971 ft.lbs	SEISMIC MOMENT (MB) (FT.LBS.)
WEIGHT OF SIDE BRACE (WSB)	50 lbs	X SEISMIC FACTOR X	DISTANCE TO MIDPOINT OF SIDE BRACE (DSB)	=	179 ft.lbs	SEISMIC MOMENT (MFB) (FT.LBS.)
WEIGHT OF MAST (WM)	198 lbs	X SEISMIC FACTOR X	DISTANCE TO MIDPOINT OF MAST (DM)	=	1026 ft.lbs	SEISMIC MOMENT (MM) (FT.LBS.)

WB + WFB + WM = BACKSTOP'S TOTAL WEIGHT LOAD = 4176 ft.lbs SUM OF THE MOMENTS = MB + MFB + MM

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_{VER}^{AR} VERTICAL REACTIONS AT POINT AF: $747 \text{ lbs} = \frac{\text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} + \frac{\text{WEIGHT OF THE BANK}}{2 \text{ SUPPORTS}}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

R_{VER}^{AF} VERTICAL REACTIONS AT POINT AR: $835 \text{ lbs} = \frac{\text{WEIGHT OF BANK}}{2 \text{ SUPPORTS}} + \frac{\text{MOMENT AT MAST} + \text{MOMENT AT BANK}}{\text{DISTANCE BETWEEN SUPPORTS } (A_F - A_R)} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

R_{HOR} HORIZONTAL REACTION FOR BOTH: $202 \text{ lbs} = \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} \times \text{SEISMIC FACTOR}}{2 \text{ SUPPORTS}}$

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

BANK DOWN

R_{VER}^B VERTICAL REACTION AT POINT B: $457 \text{ lbs} = \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \pm \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE BETWEEN SUPPORTS } (A-B)}$

R_{HOR}^B HORIZONTAL REACTION AT POINT B: $409 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE TO MIDPOINT OF SIDE BRACE} \times 2}$

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOIST CABLE TENSION AT POINT C: $609 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{SEISMIC FACTOR} \times \text{DISTANCE FROM A TO B}}$

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

BANK UP

R_{VER}^{A-BU} VERTICAL REACTION AT POINT A: $-16 \text{ lbs} = \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} - \text{HOIST CABLE TENSION}}{2 \text{ SUPPORTS}}$

R_{HOR}^{AF} HORIZONTAL REACTION AT POINT A: $55 \text{ lbs} = \pm \frac{\text{MOMENT AT BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

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

BANK UP

R_{VER}^{B-BU} VERTICAL REACTION AT POINT B: $640 \text{ lbs} = \text{HOIST CABLE TENSION} + \frac{\text{WEIGHT OF FRONT BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY}$

R_{HOR}^{B-BU} HORIZONTAL REACTION AT POINT B: $609 \text{ lbs} = \text{HOIST CABLE TENSION}$



REVISION	DATE	PORTER No.
A	-	-
B	-	CUSTOMER No.
C	-	-
DATE		9/21/2011

STATIC EQUIVALENT LOADING FOR:
955 Style Back Braced Backstop
25' Attachment Height

THIS PRINT IS THE PROPERTY OF PORTER ATHLETIC EQUIPMENT COMPANY AND MAY NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION

porter
WORLD LEADER
IN QUALITY SPORTS EQUIPMENT
2500 S. 25th AVENUE
BROADVIEW, ILLINOIS 60155
www.porter-ath.com

DRAWING BY	Migueroa
CHECKED BY	GS
PAGE No.	

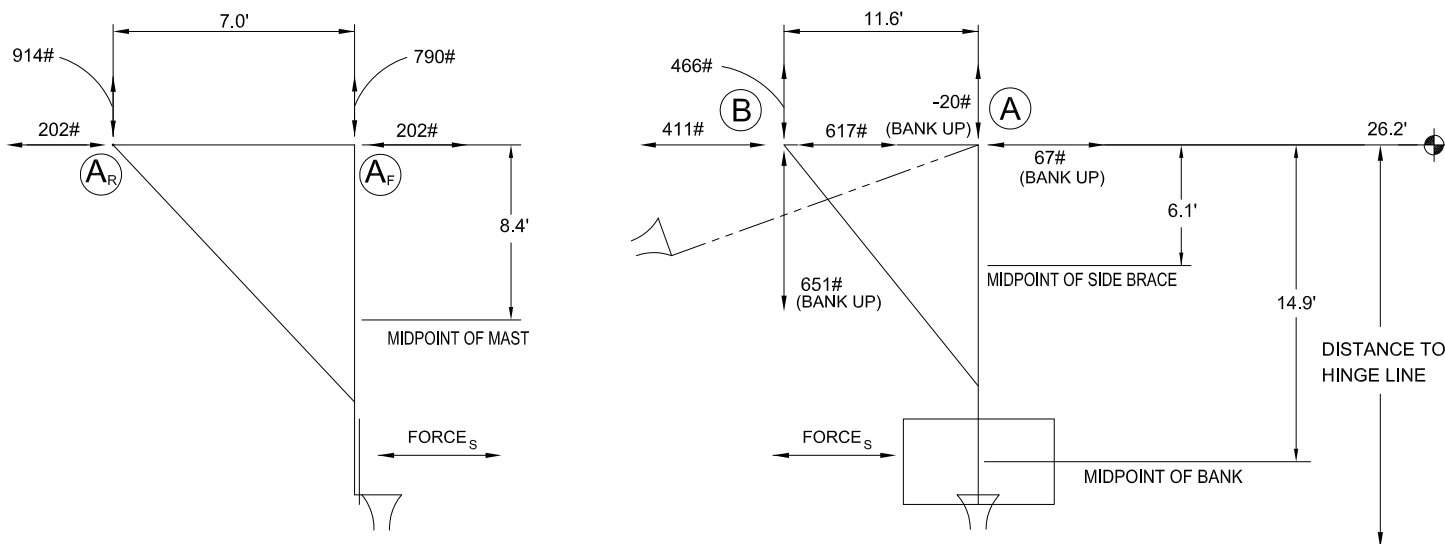


+PLEASE NOTE THESE ARE ESTIMATED
WEIGHT LOADS FROM THE
BACKSTOP MAST HANGERS TO
THE FLOOR. THESE ESTIMATES DO
NOT INCLUDE ANY
SUPERSTRUCTURE WEIGHTS.

$$WB + WFB + WM = \text{BACKSTOP'S TOTAL WEIGHT LOAD} = 4563 \text{ ft. lbs} \quad \text{SUM OF THE MOMENTS} = MB + MFB + MM$$


portersportscad

DRAWING BY Mfigueroa
CHECKED BY GS
PAGE No.



FORCES PERPENDICULAR TO BANK FIGURE 1

FORCES PARALLEL TO BANK FIGURE 2

WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD	=	577 lbs (WEIGHT OF FRONT BRACE + WEIGHT OF MAST + WEIGHT OF BANK)
WEIGHT LOAD AT POINT "A" =		552 lbs $\left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK}$
WEIGHT LOAD AT POINT "B" =		31 lbs $\left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF PULLEY}$

+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 (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB)	329 lbs	X SEISMIC FACTOR	X	DISTANCE TO MIDPOINT OF BANK (DB)	=	3431 ft.lbs	SEISMIC MOMENT (MB) (FT.LBS.)
WEIGHT OF SIDE BRACE (WSB)	55 lbs	X SEISMIC FACTOR	X	DISTANCE TO MIDPOINT OF SIDE BRACE (DSB)	=	235 ft.lbs	SEISMIC MOMENT (MFB) (FT.LBS.)
WEIGHT OF MAST (WM)	229 lbs	X SEISMIC FACTOR	X	DISTANCE TO MIDPOINT OF MAST (DM)	=	1347 ft.lbs	SEISMIC MOMENT (MM) (FT.LBS.)

WB + WFB + WM = BACKSTOP'S TOTAL WEIGHT LOAD = 5013 ft.lbs SUM OF THE MOMENTS = MB + MFB + MM

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_{VER}^{AR}	VERTICAL REACTIONS AT POINT AF:	790 lbs =	$\frac{\text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} + \frac{\text{WEIGHT OF THE BANK}}{2 \text{ SUPPORTS}}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$
	R_{VER}^{AF}	VERTICAL REACTIONS AT POINT AR:	914 lbs =	$\frac{\text{WEIGHT OF BANK}}{2 \text{ SUPPORTS}} + \frac{\text{MOMENT AT MAST} + \text{MOMENT AT BANK}}{\text{DISTANCE BETWEEN SUPPORTS } (A_F - A_R)} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$
	R_{HOR}	HORIZONTAL REACTION FOR BOTH:	202 lbs =	$\frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} \times \text{SEISMIC FACTOR}}{2 \text{ SUPPORTS}}$

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

BANK DOWN	R_{VER}^B	VERTICAL REACTION AT POINT B:	466 lbs =	$\frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \pm \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE BETWEEN SUPPORTS } (A-B)}$
	R_{HOR}^B	HORIZONTAL REACTION AT POINT B:	411 lbs =	$\frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE TO MIDPOINT OF SIDE BRACE} \times 2}$

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOIST CABLE TENSION AT POINT C: 617 lbs = $\frac{\text{SUM OF THE MOMENTS}}{\text{SEISMIC FACTOR} \times \text{DISTANCE FROM A TO B}}$

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

BANK UP	R_{VER}^{A-BU}	VERTICAL REACTION AT POINT A:	-20 lbs =	$\frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} - \text{HOIST CABLE TENSION}}{2 \text{ SUPPORTS}}$
	R_{HOR}^{AF}	HORIZONTAL REACTION AT POINT A: FROM SEISMIC PARALLEL TO BANK	67 lbs =	$\pm \frac{\text{MOMENT AT BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

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

BANK UP	R_{VER}^{B-BU}	VERTICAL REACTION AT POINT B:	651 lbs =	$\text{HOIST CABLE TENSION} + \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY}$
	R_{HOR}^{B-BU}	HORIZONTAL REACTION AT POINT B:	617 lbs =	HOIST CABLE TENSION



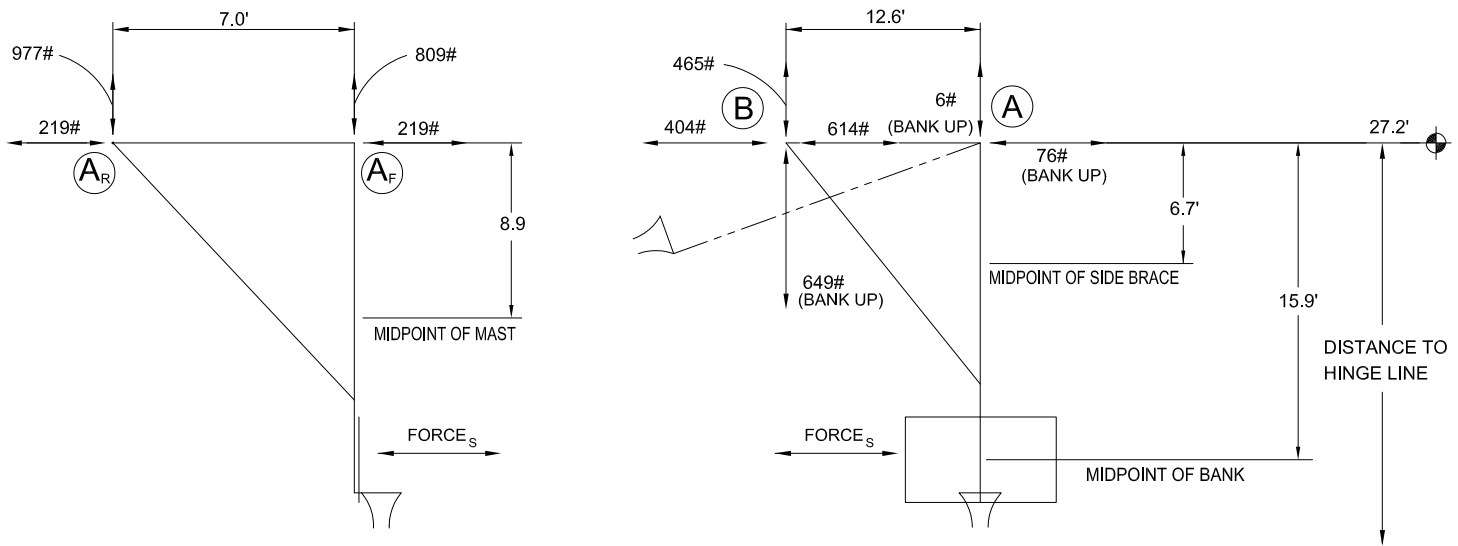
REVISION	DATE	PORTER No.
A	-	-
B	-	CUSTOMER No.
C	-	-
DATE		9/22/2011

STATIC EQUIVALENT LOADING FOR:
955 Style Back Braced Backstop
27' Attachment Height

THIS PRINT IS THE PROPERTY OF PORTER ATHLETIC EQUIPMENT COMPANY AND MAY NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION

porter
WORLD LEADER
IN QUALITY SPORTS EQUIPMENT
2500 S. 25th AVENUE
BROADVIEW, ILLINOIS 60155
www.porter-ath.com

DRAWING BY	Migueroa
CHECKED BY	GS
PAGE No.	



WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD = 625 lbs (WEIGHT OF FRONT BRACE + WEIGHT OF MAST + WEIGHT OF BANK)

WEIGHT LOAD AT POINT "A" = $597 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK}$

WEIGHT LOAD AT POINT "B" = $35 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF PULLEY}$

+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 (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB)	329 lbs	X SEISMIC FACTOR X	DISTANCE TO MIDPOINT OF BANK (DB)	=	3662 ft.lbs	SEISMIC MOMENT (MB) (FT.LBS.)
WEIGHT OF SIDE BRACE (WSB)	57 lbs	X SEISMIC FACTOR X	DISTANCE TO MIDPOINT OF SIDE BRACE (DSB)	=	267 ft.lbs	SEISMIC MOMENT (MFB) (FT.LBS.)
WEIGHT OF MAST (WM)	239 lbs	X SEISMIC FACTOR X	DISTANCE TO MIDPOINT OF MAST (DM)	=	1489 ft.lbs	SEISMIC MOMENT (MM) (FT.LBS.)

WB + WFB + WM = BACKSTOP'S TOTAL WEIGHT LOAD = 5418 ft.lbs SUM OF THE MOMENTS = MB + MFB + MM

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_{VER}^{AR} VERTICAL REACTIONS AT POINT AF: $809 \text{ lbs} = \frac{\text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} + \frac{\text{WEIGHT OF THE BANK}}{2 \text{ SUPPORTS}}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

R_{VER}^{AF} VERTICAL REACTIONS AT POINT AR: $977 \text{ lbs} = \frac{\text{WEIGHT OF BANK}}{2 \text{ SUPPORTS}} + \frac{\text{MOMENT AT MAST} + \text{MOMENT AT BANK}}{\text{DISTANCE BETWEEN SUPPORTS } (A_F - A_R)} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

R_{HOR} HORIZONTAL REACTION FOR BOTH: $219 \text{ lbs} = \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR}}{2 \text{ SUPPORTS}}$

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

BANK DOWN

R_{VER}^B VERTICAL REACTION AT POINT B: $465 \text{ lbs} = \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \pm \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE BETWEEN SUPPORTS } (A-B)}$

R_{HOR}^B HORIZONTAL REACTION AT POINT B: $404 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE TO MIDPOINT OF SIDE BRACE X 2}}$

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOIST CABLE TENSION AT POINT C: $614 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{SEISMIC FACTOR X DISTANCE FROM A TO B}}$

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

BANK UP

R_{VER}^{A-BU} VERTICAL REACTION AT POINT A: $6 \text{ lbs} = \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} - \text{HOIST CABLE TENSION}}{2 \text{ SUPPORTS}}$

R_{HOR}^{AF} HORIZONTAL REACTION AT POINT A: FROM SEISMIC PARALLEL TO BANK $76 \text{ lbs} = \pm \frac{\text{MOMENT AT BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

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

BANK UP

R_{VER}^{B-BU} VERTICAL REACTION AT POINT B: $649 \text{ lbs} = \text{HOIST CABLE TENSION} + \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY}$

R_{HOR}^{B-BU} HORIZONTAL REACTION AT POINT B: $614 \text{ lbs} = \text{HOIST CABLE TENSION}$



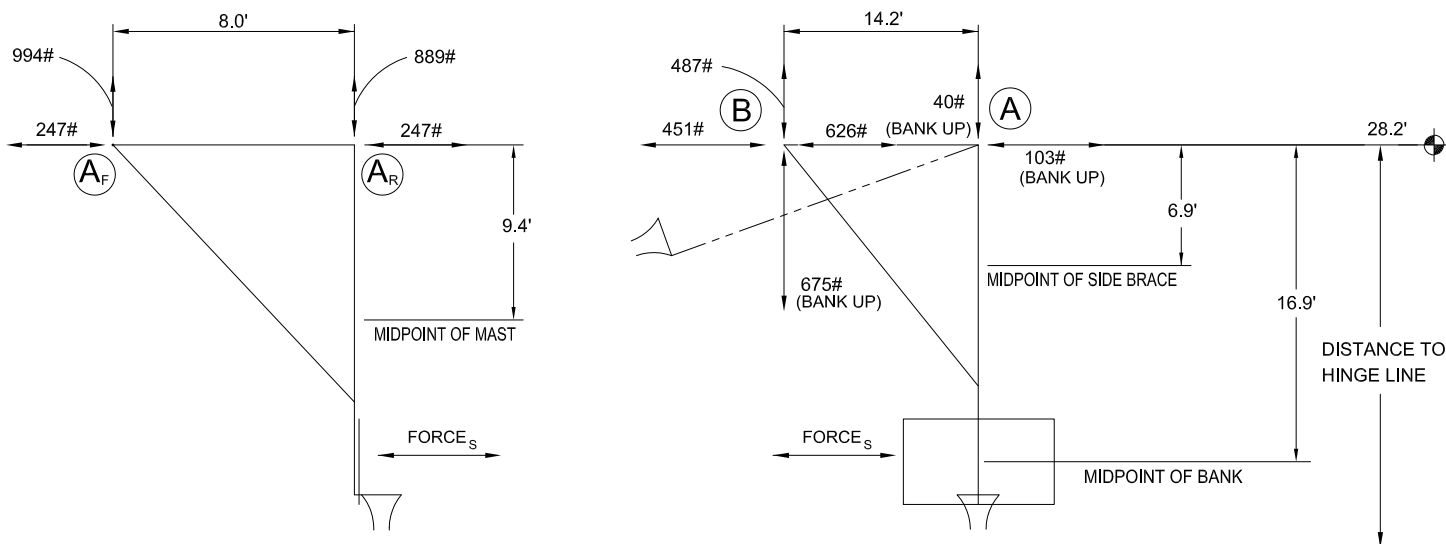
REVISION	DATE	PORTER No.
A	-	-
B	-	CUSTOMER No.
C	-	-
DATE		9/22/2011

STATIC EQUIVALENT LOADING FOR:
955 Style Back Braced Backstop
28' Attachment Height

THIS PRINT IS THE PROPERTY OF PORTER ATHLETIC EQUIPMENT COMPANY AND MAY NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION

porter
WORLD LEADER
IN QUALITY SPORTS EQUIPMENT
2500 S. 25th AVENUE
BROADVIEW, ILLINOIS 60155
www.porter-ath.com

DRAWING BY	Migueroa
CHECKED BY	GS
PAGE No.	



FORCES PERPENDICULAR TO BANK FIGURE 1

FORCES PARALLEL TO BANK FIGURE 2

WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD	=	706 lbs (WEIGHT OF FRONT BRACE + WEIGHT OF MAST + WEIGHT OF BANK)
WEIGHT LOAD AT POINT "A" =		664 lbs $\left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK}$
WEIGHT LOAD AT POINT "B" =		49 lbs $\left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF PULLEY}$

+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 (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB)	329 lbs	X SEISMIC FACTOR	X	DISTANCE TO MIDPOINT OF BANK (DB)	=	3892 ft.lbs	SEISMIC MOMENT (MB) (FT.LBS.)
WEIGHT OF SIDE BRACE (WSB)	85 lbs	X SEISMIC FACTOR	X	DISTANCE TO MIDPOINT OF SIDE BRACE (DSB)	=	411 ft.lbs	SEISMIC MOMENT (MFB) (FT.LBS.)
WEIGHT OF MAST (WM)	292 lbs	X SEISMIC FACTOR	X	DISTANCE TO MIDPOINT OF MAST (DM)	=	1921 ft.lbs	SEISMIC MOMENT (MM) (FT.LBS.)

WB + WFB + WM = BACKSTOP'S TOTAL WEIGHT LOAD = 6224 ft.lbs SUM OF THE MOMENTS = MB + MFB + MM

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_{VER}^{AR}	VERTICAL REACTIONS AT POINT AF:	889 lbs =	$\frac{\text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} + \frac{\text{WEIGHT OF THE BANK}}{2 \text{ SUPPORTS}}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$
	R_{VER}^{AF}	VERTICAL REACTIONS AT POINT AR:	994 lbs =	$\frac{\text{WEIGHT OF BANK}}{2 \text{ SUPPORTS}} + \frac{\text{MOMENT AT MAST} + \text{MOMENT AT BANK}}{\text{DISTANCE BETWEEN SUPPORTS } (A_F - A_R)} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$
	R_{HOR}	HORIZONTAL REACTION FOR BOTH:	247 lbs =	$\frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} \times \text{SEISMIC FACTOR}}{2 \text{ SUPPORTS}}$

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

BANK DOWN	R_{VER}^B	VERTICAL REACTION AT POINT B:	487 lbs =	$\frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \pm \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE BETWEEN SUPPORTS } (A-B)}$
	R_{HOR}^B	HORIZONTAL REACTION AT POINT B:	451 lbs =	$\frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE TO MIDPOINT OF SIDE BRACE} \times 2}$

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOIST CABLE TENSION AT POINT C: 626 lbs = $\frac{\text{SUM OF THE MOMENTS}}{\text{SEISMIC FACTOR} \times \text{DISTANCE FROM A TO B}}$

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

BANK UP	R_{VER}^{A-BU}	VERTICAL REACTION AT POINT A:	40 lbs =	$\frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} - \text{HOIST CABLE TENSION}}{2 \text{ SUPPORTS}}$
	R_{HOR}^{AF}	HORIZONTAL REACTION AT POINT A: FROM SEISMIC PARALLEL TO BANK	103 lbs =	$\pm \frac{\text{MOMENT AT BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

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

BANK UP	R_{VER}^{B-BU}	VERTICAL REACTION AT POINT B:	675 lbs =	$\text{HOIST CABLE TENSION} + \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY}$
	R_{HOR}^{B-BU}	HORIZONTAL REACTION AT POINT B:	626 lbs =	HOIST CABLE TENSION



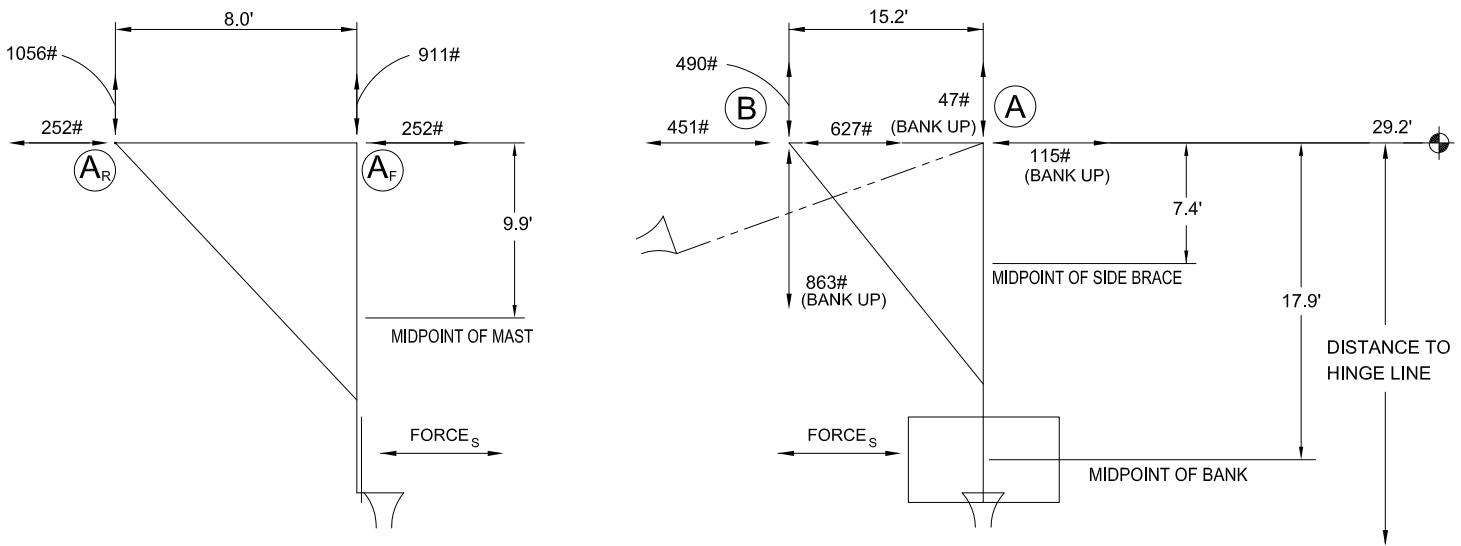
REVISION	DATE	Porter No.
A	-	-
B	-	CUSTOMER No.
C	-	-
DATE		9/22/2011

STATIC EQUIVALENT LOADING FOR:
955 Style backstop
29' Attachment Height

THIS PRINT IS THE PROPERTY OF PORTER ATHLETIC EQUIPMENT COMPANY AND MAY NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION

porter
WORLD LEADER
IN QUALITY SPORTS EQUIPMENT
2500 S. 25th AVENUE
BROADVIEW, ILLINOIS 60155
www.porter-ath.com

DRAWING BY	Migueroa
CHECKED BY	GS
PAGE No.	



FORCES PERPENDICULAR TO BANK FIGURE 1

FORCES PARALLEL TO BANK FIGURE 2

WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD	=	720 lbs (WEIGHT OF FRONT BRACE + WEIGHT OF MAST + WEIGHT OF BANK)
WEIGHT LOAD AT POINT "A" =		676 lbs $\left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK}$
WEIGHT LOAD AT POINT "B" =		51 lbs $\left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF PULLEY}$

+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 (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB)	329 lbs	X SEISMIC FACTOR X	DISTANCE TO MIDPOINT OF BANK (DB)	=	4122 ft.lbs	SEISMIC MOMENT (MB) (FT.LBS.)
WEIGHT OF SIDE BRACE (WSB)	89 lbs	X SEISMIC FACTOR X	DISTANCE TO MIDPOINT OF SIDE BRACE (DSB)	=	461 ft.lbs	SEISMIC MOMENT (MFB) (FT.LBS.)
WEIGHT OF MAST (WM)	302 lbs	X SEISMIC FACTOR X	DISTANCE TO MIDPOINT OF MAST (DM)	=	2093 ft.lbs	SEISMIC MOMENT (MM) (FT.LBS.)

WB + WFB + WM = BACKSTOP'S TOTAL WEIGHT LOAD = 6676 ft.lbs SUM OF THE MOMENTS = MB + MFB + MM

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_{VER}^{AR}	VERTICAL REACTIONS AT POINT AF:	911 lbs =	$\frac{\text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} + \frac{\text{WEIGHT OF THE BANK}}{2 \text{ SUPPORTS}}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$
	R_{VER}^{AF}	VERTICAL REACTIONS AT POINT AR:	1056 lbs =	$\frac{\text{WEIGHT OF BANK}}{2 \text{ SUPPORTS}} + \frac{\text{MOMENT AT MAST} + \text{MOMENT AT BANK}}{\text{DISTANCE BETWEEN SUPPORTS } (A_F - A_R)} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$
	R_{HOR}	HORIZONTAL REACTION FOR BOTH:	252 lbs =	$\frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR}}{2 \text{ SUPPORTS}}$

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

BANK DOWN	R_{VER}^B	VERTICAL REACTION AT POINT B:	490 lbs =	$\frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \pm \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE BETWEEN SUPPORTS } (A-B)}$
	R_{HOR}^B	HORIZONTAL REACTION AT POINT B:	451 lbs =	$\frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE TO MIDPOINT OF SIDE BRACE X 2}}$

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOIST CABLE TENSION AT POINT C: 627 lbs = $\frac{\text{SUM OF THE MOMENTS}}{\text{SEISMIC FACTOR X DISTANCE FROM A TO B}}$

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

BANK UP	R_{VER}^{A-BU}	VERTICAL REACTION AT POINT A:	47 lbs =	$\frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} - \text{HOIST CABLE TENSION}}{2 \text{ SUPPORTS}}$
	R_{HOR}^{AF}	HORIZONTAL REACTION AT POINT A: FROM SEISMIC PARALLEL TO BANK	115 lbs =	$\pm \frac{\text{MOMENT AT BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

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

BANK UP	R_{VER}^{B-BU}	VERTICAL REACTION AT POINT B:	863 lbs =	$\text{HOIST CABLE TENSION} + \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY}$
	R_{HOR}^{B-BU}	HORIZONTAL REACTION AT POINT B:	627 lbs =	HOIST CABLE TENSION



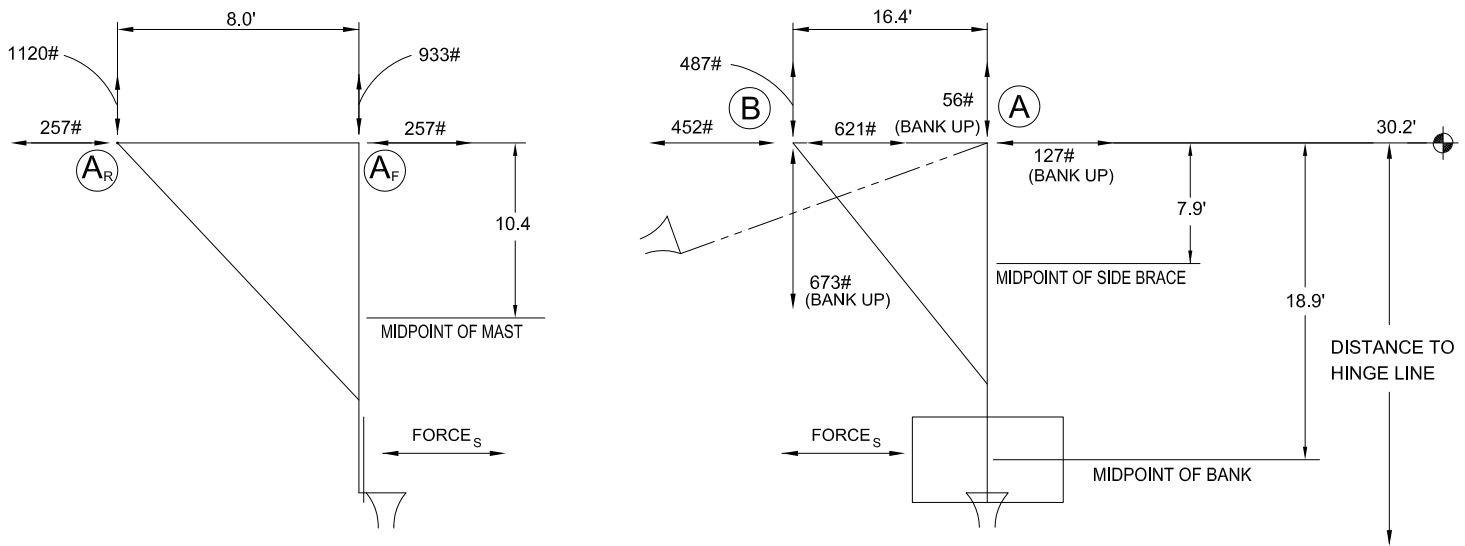
REVISION	DATE	Porter No.
A	-	-
B	-	CUSTOMER No.
C	-	-
DATE		9/22/2011

STATIC EQUIVALENT LOADING FOR:
955 Style Back Braced Backstop
30' Attachment Height

THIS PRINT IS THE PROPERTY OF PORTER ATHLETIC EQUIPMENT COMPANY AND MAY NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION

porter
WORLD LEADER
IN QUALITY SPORTS EQUIPMENT
2500 S. 25th AVENUE
BROADVIEW, ILLINOIS 60155
www.porter-ath.com

DRAWING BY	Migueroa
CHECKED BY	GS
PAGE No.	



FORCES PERPENDICULAR TO BANK FIGURE 1

FORCES PARALLEL TO BANK FIGURE 2

WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD = 733 lbs (WEIGHT OF FRONT BRACE + WEIGHT OF MAST + WEIGHT OF BANK)

WEIGHT LOAD AT POINT "A" = $687 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF MAST} + \text{WEIGHT OF BANK}$

WEIGHT LOAD AT POINT "B" = $52 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF PULLEY}$

+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 (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF BANK (WB)	329 lbs	X SEISMIC FACTOR X	DISTANCE TO MIDPOINT OF BANK (DB)	=	4353 ft.lbs	SEISMIC MOMENT (MB) (FT.LBS.)
WEIGHT OF SIDE BRACE (WSB)	92 lbs	X SEISMIC FACTOR X	DISTANCE TO MIDPOINT OF SIDE BRACE (DSB)	=	509 ft.lbs	SEISMIC MOMENT (MFB) (FT.LBS.)
WEIGHT OF MAST (WM)	312 lbs	X SEISMIC FACTOR X	DISTANCE TO MIDPOINT OF MAST (DM)	=	2271 ft.lbs	SEISMIC MOMENT (MM) (FT.LBS.)

WB + WFB + WM = BACKSTOP'S TOTAL WEIGHT LOAD = 7133 ft.lbs SUM OF THE MOMENTS = MB + MFB + MM

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_{VER}^{AR} VERTICAL REACTIONS AT POINT AF: $933 \text{ lbs} = \frac{\text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} + \frac{\text{WEIGHT OF THE BANK}}{2 \text{ SUPPORTS}}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

R_{VER}^{AF} VERTICAL REACTIONS AT POINT AR: $1120 \text{ lbs} = \frac{\text{WEIGHT OF BANK}}{2 \text{ SUPPORTS}} + \frac{\text{MOMENT AT MAST} + \text{MOMENT AT BANK}}{\text{DISTANCE BETWEEN SUPPORTS } (A_F - A_R)} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

R_{HOR} HORIZONTAL REACTION FOR BOTH: $257 \text{ lbs} = \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} \times \text{SEISMIC FACTOR}}{2 \text{ SUPPORTS}}$

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

BANK DOWN

R_{VER}^B VERTICAL REACTION AT POINT B: $487 \text{ lbs} = \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \pm \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE BETWEEN SUPPORTS } (A-B)}$

R_{HOR}^B HORIZONTAL REACTION AT POINT B: $452 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE TO MIDPOINT OF SIDE BRACE} \times 2}$

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

HOIST CABLE TENSION AT POINT C: $621 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{SEISMIC FACTOR} \times \text{DISTANCE FROM A TO B}}$

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

BANK UP

R_{VER}^{A-BU} VERTICAL REACTION AT POINT A: $56 \text{ lbs} = \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} - \text{HOIST CABLE TENSION}}{2 \text{ SUPPORTS}}$

R_{HOR}^{AF} HORIZONTAL REACTION AT POINT A: $127 \text{ lbs} = \pm \frac{\text{MOMENT AT BRACE}}{\text{DISTANCE FROM } A_F \text{ TO } A_R / 2}$

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

BANK UP

R_{VER}^{B-BU} VERTICAL REACTION AT POINT B: $673 \text{ lbs} = \text{HOIST CABLE TENSION} + \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY}$

R_{HOR}^{B-BU} HORIZONTAL REACTION AT POINT B: $621 \text{ lbs} = \text{HOIST CABLE TENSION}$



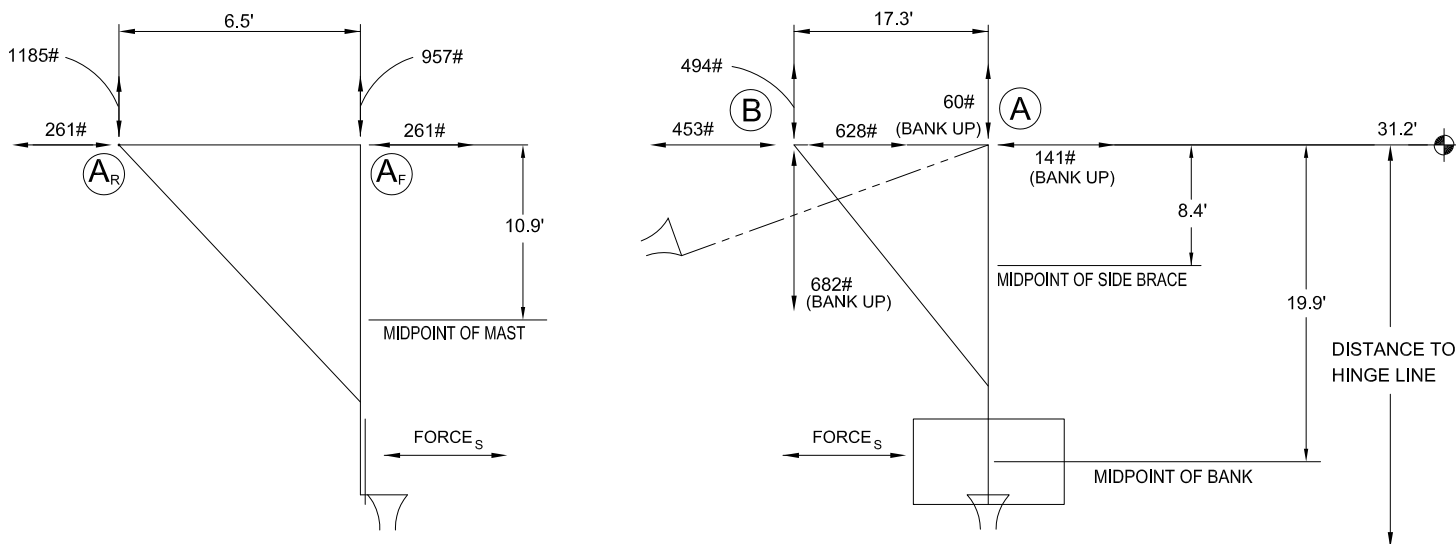
REVISION	DATE	PORTER No.
A	-	-
B	-	CUSTOMER No.
C	-	-
DATE		9/22/2011

STATIC EQUIVALENT LOADING FOR:
955 Style Back Braced Backstop
31' Attachment Height

THIS PRINT IS THE PROPERTY OF PORTER ATHLETIC EQUIPMENT COMPANY AND MAY NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION

porter
WORLD LEADER
IN QUALITY SPORTS EQUIPMENT
2500 S. 25th AVENUE
BROADVIEW, ILLINOIS 60155
www.porter-ath.com

DRAWING BY
Migueroa
CHECKED BY
GS
PAGE No.



FORCES PERPENDICULAR TO BANK FIGURE 1

FORCES PARALLEL TO BANK FIGURE 2

WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

$$\begin{aligned} \text{BACKSTOP'S TOTAL WEIGHT LOAD} &= 747 \text{ lbs (WEIGHT OF FRONT BRACE + WEIGHT OF MAST + WEIGHT OF BANK)} \\ \text{WEIGHT LOAD AT POINT "A"} &= 699 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF MAST + WEIGHT OF BANK} \\ \text{WEIGHT LOAD AT POINT "B"} &= 54 \text{ lbs} \left(\frac{\text{WEIGHT OF SIDE BRACE}}{2} \right) + \text{WEIGHT OF PULLEY} \end{aligned}$$

+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)

$$\begin{aligned} \text{WEIGHT OF BANK (WB)} &329 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF BANK (DB)} &= 4583 \text{ ft.lbs} &\text{SEISMIC MOMENT (MB) (FT.LBS.)} \\ \text{WEIGHT OF SIDE BRACE (WSB)} &96 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF SIDE BRACE (DSB)} &= 564 \text{ ft.lbs} &\text{SEISMIC MOMENT (MFB) (FT.LBS.)} \\ \text{WEIGHT OF MAST (WM)} &322 \text{ lbs} \times \text{SEISMIC FACTOR} \times \text{DISTANCE TO MIDPOINT OF MAST (DM)} &= 2457 \text{ ft.lbs} &\text{SEISMIC MOMENT (MM) (FT.LBS.)} \end{aligned}$$

$$\text{WB} + \text{WFB} + \text{WM} = \text{BACKSTOP'S TOTAL WEIGHT LOAD} = 7604 \text{ ft.lbs} \quad \text{SUM OF THE MOMENTS} = \text{MB} + \text{MFB} + \text{MM}$$

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)

$$\begin{aligned} \text{BANK DOWN} \quad R_{\text{VER}}^{\text{AR}} &\text{ VERTICAL REACTIONS AT POINT AF: } 957 \text{ lbs} = \frac{\text{WEIGHT OF MAST} + \text{WEIGHT OF BANK} + \frac{\text{WEIGHT OF THE BANK}}{2 \text{ SUPPORTS}}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \\ R_{\text{VER}}^{\text{AF}} &\text{ VERTICAL REACTIONS AT POINT AR: } 1185 \text{ lbs} = \frac{\text{WEIGHT OF BANK}}{2 \text{ SUPPORTS}} + \frac{\text{MOMENT AT MAST} + \text{MOMENT AT BANK}}{\text{DISTANCE BETWEEN SUPPORTS (A}_F - \text{A}_R)} \pm \frac{\text{MOMENT OF THE BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \\ R_{\text{HOR}} &\text{ HORIZONTAL REACTION FOR BOTH: } 261 \text{ lbs} = \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} \times \text{SEISMIC FACTOR}}{2 \text{ SUPPORTS}} \end{aligned}$$

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

$$\begin{aligned} \text{BANK DOWN} \quad R_{\text{VER}}^{\text{B}} &\text{ VERTICAL REACTION AT POINT B: } 494 \text{ lbs} = \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \pm \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE BETWEEN SUPPORTS (A-B)}} \\ R_{\text{HOR}}^{\text{B}} &\text{ HORIZONTAL REACTION AT POINT B: } 453 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{DISTANCE TO MIDPOINT OF SIDE BRACE} \times 2} \end{aligned}$$

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

$$\text{HOIST CABLE TENSION AT POINT C: } 628 \text{ lbs} = \frac{\text{SUM OF THE MOMENTS}}{\text{SEISMIC FACTOR} \times \text{DISTANCE FROM A TO B}}$$

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

$$\begin{aligned} \text{BANK UP} \quad R_{\text{VER}}^{\text{A-BU}} &\text{ VERTICAL REACTION AT POINT A: } 60 \text{ lbs} = \frac{\text{BACKSTOP'S TOTAL WEIGHT LOAD} - \text{HOIST CABLE TENSION}}{2 \text{ SUPPORTS}} \\ R_{\text{HOR}}^{\text{AF}} &\text{ HORIZONTAL REACTION AT POINT A: } 141 \text{ lbs} = \pm \frac{\text{MOMENT AT BRACE}}{\text{DISTANCE FROM A}_F \text{ TO A}_R / 2} \end{aligned}$$

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

$$\begin{aligned} \text{BANK UP} \quad R_{\text{VER}}^{\text{B-BU}} &\text{ VERTICAL REACTION AT POINT B: } 682 \text{ lbs} = \text{HOIST CABLE TENSION} + \frac{\text{WEIGHT OF SIDE BRACE}}{2 \text{ SUPPORTS}} + \text{WEIGHT OF PULLEY} \\ R_{\text{HOR}}^{\text{B-BU}} &\text{ HORIZONTAL REACTION AT POINT B: } 628 \text{ lbs} = \text{HOIST CABLE TENSION} \end{aligned}$$



REVISION	DATE	PORTER No.
A	-	-
B	-	CUSTOMER No.
C	-	-
DATE		9/22/2011

STATIC EQUIVALENT LOADING FOR:
955 Style Back Braced Backstop
32' Attachment Height

THIS PRINT IS THE PROPERTY OF PORTER ATHLETIC EQUIPMENT COMPANY AND MAY NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION

porter
WORLD LEADER
IN QUALITY SPORTS EQUIPMENT
2500 S. 25th AVENUE
BROADVIEW, ILLINOIS 60155
www.porter-ath.com

DRAWING BY
Migueroa
CHECKED BY
GS
PAGE No.