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:

16' Attachment Height  
17' Attachment Height  
18' Attachment Height  
19' Attachment Height  
20' Attachment Height  
21' Attachment Height  
22' Attachment Height  
23' Attachment Height  
24' Attachment Height  
25' Attachment Height  
26' Attachment Height  
27' Attachment Height  
28' Attachment Height  
29' Attachment Height  
30' Attachment Height  
31' Attachment Height  
32' Attachment Height
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD = SUM OF THE MOMENTS = 120.8 ft-lb

WEIGHT LOAD AT POINT "A" = 2500 lbs

WEIGHT LOAD AT POINT "B" = 4000 lbs

WEIGHT OF REAR BRACE

WEIGHT OF REAR BRACE

WEIGHT OF MAST

WEIGHT OF BANK

DISTANCE TO MIDPOINT OF BANK

DISTANCE TO MIDPOINT OF FRONT BRACE

DISTANCE TO MIDPOINT OF MAST

BACKSTOP'S TOTAL WEIGHT LOAD (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK + WEIGHT OF PULLEY) = SUM OF THE MOMENTS = 120.8 ft-lb

HOIST CABLE TENSION AT POINT A: = SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT B: = SUM OF THE MOMENTS

STATIC EQUIVALENT LOADING FOR:

923 Style Backstop

16' Attachment Height

WEIGHT LOADS FROM THE BACKSTOP MAST HANGERS TO THE FLOOR. THESE ESTIMATES DO NOT INCLUDE ANY SUPERSTRUCTURE WEIGHTS.
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

WEIGHT LOAD AT POINT "A" = WEIGHT LOAD AT POINT "B" = WEIGHT OF REAR BRACE

POINTS REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

WEIGHT LOAD AT POINT "A" = WEIGHT LOAD AT POINT "B" = WEIGHT OF REAR BRACE

WEIGHT LOAD AT POINT "A" = WEIGHT LOAD AT POINT "B" = WEIGHT OF REAR BRACE

HORIZONTAL REACTION AT POINT A: SUM OF THE MOMENTS

VERTICAL REACTION AT POINT A: SUM OF THE MOMENTS

HORIZONTAL REACTION AT POINT B: SUM OF THE MOMENTS

VERTICAL REACTION AT POINT B: SUM OF THE MOMENTS

WEIGHT LOAD AT POINT "A" = WEIGHT LOAD AT POINT "B" = WEIGHT OF REAR BRACE

WEIGHT LOAD AT POINT "A" = WEIGHT LOAD AT POINT "B" = WEIGHT OF REAR BRACE

WEIGHT LOAD AT POINT "A" = WEIGHT LOAD AT POINT "B" = WEIGHT OF REAR BRACE

WEIGHT LOAD AT POINT "A" = WEIGHT LOAD AT POINT "B" = WEIGHT OF REAR BRACE

WEIGHT LOAD AT POINT "A" = WEIGHT LOAD AT POINT "B" = WEIGHT OF REAR BRACE
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD = WEIGHT OF REAR BRACE + WEIGHT OF BANK + WEIGHT OF MAST
WEIGHT LOAD AT POINT "A" = (WEIGHT OF REAR BRACE) / 2
WEIGHT LOAD AT POINT "B" = (WEIGHT OF REAR BRACE) / 2

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

GEOMETRY FACTOR = 1.2

WEIGHT OF BANK (In): 26' X GEOMETRY FACTOR / DISTANCE TO MIDPOINT OF BANK (In) = SEISMIC MOMENT (MB) (FT.LBS.)
WEIGHT OF REAR BRACE (In): 21' X GEOMETRY FACTOR / DISTANCE TO MIDPOINT OF REAR BRACE (In) = SEISMIC MOMENT (MRB) (FT.LBS.)
WEIGHT OF MAST (In): 27' X GEOMETRY FACTOR / DISTANCE TO MIDPOINT OF MAST (In) = SEISMIC MOMENT (MM) (FT.LBS.)

SEISMIC MOMENT (MB) (FT.LBS.) + WEIGHT OF PULLEY = BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR

SEPTEMBER LOAD AT POINT "A" = (WEIGHT LOAD AT POINT "A") / 2 SUPPORTS

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

GEOMETRY FACTOR = 1.2

WEIGHT OF BANK (In): 26' X GEOMETRY FACTOR / DISTANCE TO MIDPOINT OF BANK (In) = SEISMIC MOMENT (MB) (FT.LBS.)
WEIGHT OF REAR BRACE (In): 21' X GEOMETRY FACTOR / DISTANCE TO MIDPOINT OF REAR BRACE (In) = SEISMIC MOMENT (MRB) (FT.LBS.)
WEIGHT OF MAST (In): 27' X GEOMETRY FACTOR / DISTANCE TO MIDPOINT OF MAST (In) = SEISMIC MOMENT (MM) (FT.LBS.)

SEISMIC MOMENT (MB) (FT.LBS.) + WEIGHT OF PULLEY = BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR

POINT REACTIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK DOWN

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

HORIZONTAL REACTION AT POINT A = SUM OF THE MOMENTS / DISTANCE BETWEEN SUPPORTS (A-A)

WEIGHT LOAD AT POINT "A" = WEIGTH OF REAR BRACE + WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT B = SUM OF THE MOMENTS / DISTANCE TO MIDPOINT OF REAR BRACE (A-B)

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT A = SUM OF THE MOMENTS / DISTANCE BETWEEN SUPPORTS (A-A)

WEIGHT LOAD AT POINT "A" = WEIGTH OF REAR BRACE + WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT B = SUM OF THE MOMENTS / DISTANCE TO MIDPOINT OF REAR BRACE (A-B)

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT A = SUM OF THE MOMENTS / DISTANCE BETWEEN SUPPORTS (A-A)

WEIGHT LOAD AT POINT "A" = WEIGTH OF REAR BRACE + WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT B = SUM OF THE MOMENTS / DISTANCE TO MIDPOINT OF REAR BRACE (A-B)

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT A = SUM OF THE MOMENTS / DISTANCE BETWEEN SUPPORTS (A-A)

WEIGHT LOAD AT POINT "A" = WEIGTH OF REAR BRACE + WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT B = SUM OF THE MOMENTS / DISTANCE TO MIDPOINT OF REAR BRACE (A-B)

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT A = SUM OF THE MOMENTS / DISTANCE BETWEEN SUPPORTS (A-A)

WEIGHT LOAD AT POINT "A" = WEIGTH OF REAR BRACE + WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT B = SUM OF THE MOMENTS / DISTANCE TO MIDPOINT OF REAR BRACE (A-B)

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT A = SUM OF THE MOMENTS / DISTANCE BETWEEN SUPPORTS (A-A)

WEIGHT LOAD AT POINT "A" = WEIGTH OF REAR BRACE + WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT B = SUM OF THE MOMENTS / DISTANCE TO MIDPOINT OF REAR BRACE (A-B)

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT A = SUM OF THE MOMENTS / DISTANCE BETWEEN SUPPORTS (A-A)

WEIGHT LOAD AT POINT "A" = WEIGTH OF REAR BRACE + WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT B = SUM OF THE MOMENTS / DISTANCE TO MIDPOINT OF REAR BRACE (A-B)

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT A = SUM OF THE MOMENTS / DISTANCE BETWEEN SUPPORTS (A-A)

WEIGHT LOAD AT POINT "A" = WEIGTH OF REAR BRACE + WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT B = SUM OF THE MOMENTS / DISTANCE TO MIDPOINT OF REAR BRACE (A-B)

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT A = SUM OF THE MOMENTS / DISTANCE BETWEEN SUPPORTS (A-A)

WEIGHT LOAD AT POINT "A" = WEIGTH OF REAR BRACE + WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

HORIZONTAL REACTION AT POINT B = SUM OF THE MOMENTS / DISTANCE TO MIDPOINT OF REAR BRACE (A-B)

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

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

BACKSTOP'S TOTAL WEIGHT LOAD = 964 lbs = WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK

WEIGHT LOAD AT POINT "A" = 363 lbs = WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "B" = 195 lbs = WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7

WEIGHT OF BANK (WB) x SEISMIC FACTOR x DISTANCE TO MIDPOINT OF BANK (DB) = BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR

DISTANCE TO MIDPOINT OF FRONT BRACE (DFB) x SEISMIC FACTOR x WEIGHT OF REAR BRACE (WRB) = BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR

DISTANCE TO MIDPOINT OF MAST (DM) x SEISMIC FACTOR x WEIGHT OF MAST (WM) = BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR

BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR = SUM OF THE MOMENTS

WEIGHT LOAD AT POINT "A" = SUM OF THE MOMENTS

WEIGHT LOAD AT POINT "B" = SUM OF THE MOMENTS

HORIZONTAL REACTION AT POINT A: SUM OF THE MOMENTS

HORIZONTAL REACTION AT POINT B: SUM OF THE MOMENTS

VERTICAL REACTION AT POINT A: 

VERTICAL REACTION AT POINT B: 

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)

HORIZONTAL REACTION AT POINT A: SUM OF THE MOMENTS

HORIZONTAL REACTION AT POINT B: SUM OF THE MOMENTS

VERTICAL REACTION AT POINT A: SUM OF THE MOMENTS

VERTICAL REACTION AT POINT B: SUM OF THE MOMENTS

STATIC EQUIVALENT LOADING FOR:
923 Style Backstop
19' Attachment Height

WEIGHT LOAD AT POINT "A" = 363 lbs = WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "B" = 195 lbs = WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

DISTANCE TO MIDPOINT OF REAR BRACE = 7.4 ft

FORCE PERPENDICULAR TO BANK FIGURE 1

FORCE PARALLEL TO BANK FIGURE 2

WEIGHT LOAD AT POINT "A" = SUM OF THE MOMENTS

WEIGHT LOAD AT POINT "B" = SUM OF THE MOMENTS

HORIZONTAL REACTION AT POINT A: SUM OF THE MOMENTS

HORIZONTAL REACTION AT POINT B: SUM OF THE MOMENTS

VERTICAL REACTION AT POINT A: SUM OF THE MOMENTS

VERTICAL REACTION AT POINT B: SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT B: SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT B: SUM OF THE MOMENTS

WEIGHT LOAD AT POINT "A" = SUM OF THE MOMENTS

WEIGHT LOAD AT POINT "B" = SUM OF THE MOMENTS

HORIZONTAL REACTION AT POINT A: SUM OF THE MOMENTS

HORIZONTAL REACTION AT POINT B: SUM OF THE MOMENTS

VERTICAL REACTION AT POINT A: SUM OF THE MOMENTS

VERTICAL REACTION AT POINT B: SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT B: SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT B: SUM OF THE MOMENTS

WEIGHT LOAD AT POINT "A" = SUM OF THE MOMENTS

WEIGHT LOAD AT POINT "B" = SUM OF THE MOMENTS

HORIZONTAL REACTION AT POINT A: SUM OF THE MOMENTS

HORIZONTAL REACTION AT POINT B: SUM OF THE MOMENTS

VERTICAL REACTION AT POINT A: SUM OF THE MOMENTS

VERTICAL REACTION AT POINT B: SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT B: SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT B: SUM OF THE MOMENTS

WEIGHT LOAD AT POINT "A" = SUM OF THE MOMENTS

WEIGHT LOAD AT POINT "B" = SUM OF THE MOMENTS

HORIZONTAL REACTION AT POINT A: SUM OF THE MOMENTS

HORIZONTAL REACTION AT POINT B: SUM OF THE MOMENTS

VERTICAL REACTION AT POINT A: SUM OF THE MOMENTS

VERTICAL REACTION AT POINT B: SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT B: SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT B: SUM OF THE MOMENTS
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD

WEIGHT LOAD AT POINT "A" = WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK

WEIGHT LOAD AT POINT "B" = WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7

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

DISTANCE TO MIDPOINT OF FRONT BRACE (DFB) X SEISMIC FACTOR X WEIGHT OF REAR BRACE (WRB) =

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

BACKSTOP'S TOTAL WEIGHT LOAD = WEIGHT LOAD AT POINT "A" + WEIGHT LOAD AT POINT "B" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

VERTICAL REACTIONS AT POINT A:

WEIGHT LOAD AT POINT "A" = SUM OF THE MOMENTS

HORIZONTAL REACTIONS AT POINT A:

SUM OF THE MOMENTS = BACKSTOP'S TOTAL WEIGHT LOAD - HOIST CABLE TENSION

HOIST CABLE TENSION AT POINT B:

SUM OF THE MOMENTS = DISTANCE TO MIDPOINT OF REAR BRACE X 2

VERTICAL REACTIONS AT POINT B:

WEIGHT LOAD AT POINT "B" = SUM OF THE MOMENTS

HORIZONTAL REACTIONS AT POINT B:

SUM OF THE MOMENTS = BACKSTOP'S TOTAL WEIGHT LOAD - HOIST CABLE TENSION

HOST CABLE TENSION AT POINT A:

SUM OF THE MOMENTS = BACKSTOP'S TOTAL WEIGHT LOAD + HOST CABLE TENSION

HOST CABLE TENSION AT POINT B:

SUM OF THE MOMENTS = BACKSTOP'S TOTAL WEIGHT LOAD + HOST CABLE TENSION
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD = 996 lbs

WEIGHT LOAD AT POINT "A" = 517 lbs

WEIGHT LOAD AT POINT "B" = 52 lbs

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 1.9

WEIGHT OF BANK (WB) = 308 lbs

WEIGHT OF REAR BRACE (WRB) = 208 lbs

WEIGHT OF PULLEY = 541 lbs

WEIGHT OF MAST (WM) = 594 lbs

WEIGHT LOAD AT POINT "A" = 493 lbs

WEIGHT LOAD AT POINT "B" = 300 lbs

WEIGHT LOAD AT POINT "A" = 785 lbs

WEIGHT LOAD AT POINT "B" = 628 lbs

DISTANCE TO MIDPOINT OF BANK (DB) = 300 lbs

DISTANCE TO MIDPOINT OF FRONT BRACE (DFB) = 974 ft.lbs

DISTANCE TO MIDPOINT OF MAST (DM) = 2829 ft.lbs

BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR

SEISMIC MOMENT (MB) = 112 ft.lbs

SEISMIC MOMENT (MRB) = 1743 ft.lbs

SEISMIC MOMENT (MM) = 2829 ft.lbs

SEISMIC FACTOR = 1.9

SUM OF THE MOMENTS = 300 lbs

HOIST CABLE TENSION AT POINT B: = -17 lbs

HOIST CABLE TENSION AT POINT B: = 974 lbs

DISTANCE TO MIDPOINT OF REAR BRACE X 2

HORIZONTAL REACTION AT POINT A:

SUPPORTS

DISTANCE BETWEEN SUPPORTS (A - A)

± SUM OF THE MOMENTS

VERTICAL REACTION AT POINT B:

HORIZONTAL REACTION AT POINT B:

VERTICAL REACTION AT POINT A:

STATIC EQUIVALENT LOADING FOR:

923 Style Backstop

21' Attachment Height

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

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

WEIGHT LOADS FROM THE BACKSTOP MAST HANGERS TO THE FLOOR. THESE ESTIMATES DO NOT INCLUDE ANY SUPERSTRUCTURE WEIGHTS.
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD = 640 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" = 301 lbs (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK) + WEIGHT OF PULLEY

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

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7 (APPLIED WITH SEISMIC ZONE, WEIGHT OF SUPPORT & ROOM USE)

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

DISTANCE TO MIDPOINT OF FRONT BRACE (DFB) X SEISMIC FACTOR X WEIGHT OF REAR BRACE (WFB) =

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

BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR =

2 SUPPORTS VERTICAL REACTIONS AT POINT A:
WEIGHT LOAD AT POINT "A" 2 SUPPORTS ± SUM OF THE MOMENTS
DISTANCE FROM A TO A

HORIZONTAL REACTION AT POINT A:
SUM OF THE MOMENTS
DISTANCE FROM A TO A

VERTICAL REACTION AT POINT B:
WEIGHT OF REAR BRACE 2 SUPPORTS ± SUM OF THE MOMENTS
DISTANCE BETWEEN SUPPORTS (A-B)

HORIZONTAL REACTION AT POINT B:
SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF REAR BRACE X 2

HOIST CABLE TENSION AT POINT B: SUM OF THE MOMENTS
WEIGHT LOAD - HOIST CABLE TENSION

HOIST CABLE TENSION + HOIST CABLE TENSION

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

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

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

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

Statics equivalent loading for:
923 Style Backstop
22' Attachment Height

www.porter-ath.com

2501 S. 25th Avenue
Broadview, Illinois 60155

923 Style Backstop
22' Attachment Height

923 Style Backstop
22' Attachment Height

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WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD = WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK

WEIGHT LOAD AT POINT "A" = WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK

WEIGHT LOAD AT POINT "B" = WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7 (CHANGES WITH SEISMIC ZONE, WEIGHT OF SUPPORT & ROOM USE)

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

DISTANCE TO MIDPOINT OF FRONT BRACE (DFB) x SEISMIC FACTOR x WEIGHT OF REAR BRACE (WRB) =

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

BACKSTOP'S TOTAL WEIGHT LOAD x SEISMIC FACTOR = SUM OF THE MOMENTS = MB + MFB + MM

FORCES PERPENDICULAR TO BANK (FIG. 1)

VERTICAL REACTIONS AT POINT A:

WEIGHT LOAD AT POINT "A" = SUM OF THE MOMENTS

DISTANCE FROM A TO A

HORIZONTAL REACTION AT POINT A:

SUM OF THE MOMENTS

DISTANCE FROM A TO B

VERTICAL REACTIONS AT POINT B:

WEIGHT OF REAR BRACE = SUM OF THE MOMENTS

DISTANCE TO MIDPOINT OF REAR BRACE X 2

HORIZONTAL REACTION AT POINT B:

HOIST CABLE TENSION AT POINT B = SUM OF THE MOMENTS

WEIGHT OF REAR BRACE

HORIZONTAL REACTION AT POINT B FROM SEISMIC PARALLEL TO BANK

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

BANK DOWN

RC = VERTICAL REACTION AT POINT A

WEIGHT LOAD AT POINT "A" = SUM OF THE MOMENTS

DISTANCE BETWEEN SUPPORTS (A - A)

RC = HORIZONTAL REACTION AT POINT A

BACKSTOP'S TOTAL WEIGHT LOAD x SEISMIC FACTOR = SUM OF THE MOMENTS

2 SUPPORTS

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

BANK DOWN

RC = VERTICAL REACTION AT POINT B

WEIGHT LOAD AT POINT "B" = SUM OF THE MOMENTS

DISTANCE TO SUPPORT OF REAR BRACE X 2

RC = HORIZONTAL REACTION AT POINT B

BACKSTOP'S TOTAL WEIGHT LOAD x SEISMIC FACTOR = SUM OF THE MOMENTS

2 SUPPORTS

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

BANK UP

RC = VERTICAL REACTION AT POINT B

WEIGHT LOAD AT POINT "B" = SUM OF THE MOMENTS

DISTANCE TO SUPPORT OF REAR BRACE X 2

RC = HORIZONTAL REACTION AT POINT B

BACKSTOP'S TOTAL WEIGHT LOAD x SEISMIC FACTOR = SUM OF THE MOMENTS

2 SUPPORTS

HOIST CABLE TENSION AT POINT B = SUM OF THE MOMENTS

WEIGHT OF REAR BRACE

HORIZONTAL REACTION AT POINT B FROM SEISMIC PARALLEL TO BANK

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

BANK UP

RC = VERTICAL REACTION AT POINT A

WEIGHT LOAD AT POINT "A" = SUM OF THE MOMENTS

URCHINAL REACTION AT POINT A

RC = HORIZONTAL REACTION AT POINT A

BACKSTOP'S TOTAL WEIGHT LOAD + HOIST CABLE TENSION = SUM OF THE MOMENTS

2 SUPPORTS

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

BANK UP

RC = VERTICAL REACTION AT POINT B

WEIGHT LOAD AT POINT "B" = SUM OF THE MOMENTS

DISTANCE TO SUPPORT OF REAR BRACE X 2

RC = HORIZONTAL REACTION AT POINT B

BACKSTOP'S TOTAL WEIGHT LOAD + HOIST CABLE TENSION = SUM OF THE MOMENTS

2 SUPPORTS

HOIST CABLE TENSION AT POINT B = SUM OF THE MOMENTS

WEIGHT OF REAR BRACE

HORIZONTAL REACTION AT POINT B FROM SEISMIC PARALLEL TO BANK

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

BANK UP

RC = VERTICAL REACTION AT POINT B

WEIGHT LOAD AT POINT "B" = SUM OF THE MOMENTS

DISTANCE TO SUPPORT OF REAR BRACE X 2

RC = HORIZONTAL REACTION AT POINT B

BACKSTOP'S TOTAL WEIGHT LOAD + HOIST CABLE TENSION = SUM OF THE MOMENTS

2 SUPPORTS

HOIST CABLE TENSION AT POINT B = SUM OF THE MOMENTS

WEIGHT OF REAR BRACE

HORIZONTAL REACTION AT POINT B FROM SEISMIC PARALLEL TO BANK

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

BANK UP

RC = VERTICAL REACTION AT POINT A

WEIGHT LOAD AT POINT "A" = SUM OF THE MOMENTS

DISTANCE BETWEEN SUPPORTS (A - A)

RC = HORIZONTAL REACTION AT POINT A

BACKSTOP'S TOTAL WEIGHT LOAD + HOIST CABLE TENSION = SUM OF THE MOMENTS

2 SUPPORTS

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

BANK UP

RC = VERTICAL REACTION AT POINT B

WEIGHT LOAD AT POINT "B" = SUM OF THE MOMENTS

DISTANCE TO SUPPORT OF REAR BRACE X 2

RC = HORIZONTAL REACTION AT POINT B

BACKSTOP'S TOTAL WEIGHT LOAD + HOIST CABLE TENSION = SUM OF THE MOMENTS

2 SUPPORTS

HOIST CABLE TENSION AT POINT B = SUM OF THE MOMENTS

WEIGHT OF REAR BRACE

HORIZONTAL REACTION AT POINT B FROM SEISMIC PARALLEL TO BANK

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

WEIGHT LOAD AT POINT "A" = WEIGHT LOAD AT POINT "B" = 2WEIGHT OF REAR BRACE

WEIGHT LOAD AT POINT "A" = WEIGHT LOAD AT POINT "B" = 2WEIGHT OF REAR BRACE + WEIGHT OF BANK

WEIGHT LOAD AT POINT "A" = WEIGHT LOAD AT POINT "B" = 2WEIGHT OF REAR BRACE + WEIGHT OF MAST

WEIGHT LOAD AT POINT "A" = WEIGHT LOAD AT POINT "B" = 2WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 1.1 (UNLESS SPECIFIED BY SUPPORT & ROOM USE)

WEIGHT OF BANK (WB) X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF BANK (DB) = DISTANCE TO MIDPOINT OF FRONT BRACE (DFB) X SEISMIC FACTOR X WEIGHT OF REAR BRACE (WFB)

DISTANCE TO MIDPOINT OF MAST (DM) X SEISMIC FACTOR X WEIGHT OF MAST (WM) = BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR

BACKSTOP'S TOTAL WEIGHT LOAD = WEIGHT LOAD AT POINT "A" + WEIGHT LOAD AT POINT "B" + WEIGHT OF REAR BRACE + WEIGHT OF PULLEY + WEIGHT OF MAST + WEIGHT OF BANK

SUM OF THE MOMENTS = MB + MFB + MM

HOIST CABLE TENSION = (SUM OF THE MOMENTS) / (DISTANCE FROM A TO B) / 2

MOLE FORCE PERPENDICULAR TO BANK FIGURE 1 FORCES PARALLEL TO BANK FIGURE 2

HORIZONTAL REACTION AT POINT A = SUM OF THE MOMENTS / DISTANCE BETWEEN SUPPORTS (A-B) / 2

VERB A -BU=HORRE=-BU^942 lbs 224 lbs 470 lbs 314 lbs 591 lbs 647 lbs 651 lbs

VERB B -BU=HORRE=-BU^942 lbs 224 lbs 470 lbs 314 lbs 591 lbs 647 lbs 651 lbs

VERB A = (WEIGHT LOAD AT POINT "A" + WEIGHT LOAD AT POINT "B") X 2

VERB B = (WEIGHT LOAD AT POINT "A" + WEIGHT LOAD AT POINT "B") X 2

FORCES PARALLEL TO BANK FIGURE 1 FORCES PERPENDICULAR TO BANK FIGURE 2
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD = 460 lbs - WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK

WEIGHT LOAD AT POINT "A" = 59 lbs - WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK

WEIGHT LOAD AT POINT "B" = 231 lbs - WEIGHT OF REAR BRACE + WEIGHT OF PULLEY + 35 lbs

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7

WEIGHT OF BANK (WB) X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF BANK (DB) = 964 lbs

DISTANCE TO MIDPOINT OF FRONT BRACE (DFB) X SEISMIC FACTOR X WEIGHT OF REAR BRACE (WRB) = 35 lbs

DISTANCE TO MIDPOINT OF MAST (DM) X SEISMIC FACTOR X WEIGHT OF MAST (WM) = 664 lbs

BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR = 10.4'

VERTICAL REACTIONS AT POINT A:

WEIGHT LOAD AT POINT "A" = 231 lbs - 2 SUPPORTS

± SUM OF THE MOMENTS

DISTANCE BETWEEN SUPPORTS (A - A)

VERTICAL REACTIONS AT POINT B:

WEIGHT LOAD AT POINT "B" = 59 lbs - 2 SUPPORTS

± SUM OF THE MOMENTS

DISTANCE BETWEEN SUPPORTS (A - B)

HORIZONTAL REACTIONS AT POINT A:

SUM OF THE MOMENTS

DISTANCE FROM A TO A

HORIZONTAL REACTIONS AT POINT B:

SUM OF THE MOMENTS

DISTANCE TO MIDPOINT OF REAR BRACE X 2

forces parallel to bank.figure 1

forces perpendicular to bank.figure 2

forces parallel to bank.figure 1

forces perpendicular to bank.figure 2

HOR أيضا

VER أيضا

35 lbs

664 lbs

621 lbs

231 lbs

10.4'

6.5'

469 lbs

231 lbs

965 lbs

24.2'

321 lbs

591 lbs

965 lbs

231 lbs

469 lbs

321 lbs

591 lbs

35 lbs

664 lbs

647 lbs

591 lbs

231 lbs

965 lbs

2500 S. 25th AVENUE

BROADVIEW, ILLINOIS  60155

www.porter-ath.com

10.4' 6.5'

231# 591#

2500 S. 25th AVENUE

BROADVIEW, ILLINOIS  60155

www.porter-ath.com

24.2'321# 591#
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD =
WEIGHT LOAD AT POINT "A" +
WEIGHT LOAD AT POINT "B" +
WEIGHT LOAD AT POINT "C" +
WEIGHT LOAD AT POINT "D"

WEIGHT LOAD AT POINT "A" =
WEIGHT OF REAR BRACE +
WEIGHT OF BANK +
WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "B" =
WEIGHT OF REAR BRACE +
WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "C" =
WEIGHT OF REAR BRACE +
WEIGHT OF MAST +
WEIGHT OF BANK

WEIGHT LOAD AT POINT "D" =
WEIGHT OF MAST +
WEIGHT OF Bank +
WEIGHT OF PULLEY

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7

SUM OF THE MOMENTS

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7

WEIGHT OF BANK (WB) X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF BANK (DB) =
DISTANCE TO MIDPOINT OF FRONT BRACE (DFB) X SEISMIC FACTOR X WEIGHT OF REAR BRACE (WFB) =
DISTANCE TO MIDPOINT OF MAST (DM) X SEISMIC FACTOR X WEIGHT OF MAST (WM) =
BACKSTOP'S TOTAL WEIGHT LOAD (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK)

VERTICAL REACTIONS AT POINT A:
WEIGHT LOAD AT POINT "A" / 2 SUPPORTS =
SUM OF THE MOMENTS

DISTANCE BETWEEN SUPPORTS (A - A)

HORIZONTAL REACTION AT POINT A:
SUM OF THE MOMENTS

DISTANCE BETWEEN SUPPORTS (A - A)

VERTICAL REACTION AT POINT B:
WEIGHT OF REAR BRACE / 2 SUPPORTS =
SUM OF THE MOMENTS

DISTANCE BETWEEN SUPPORTS (A - B)

HORIZONTAL REACTION AT POINT B:
HOIST CABLE TENSION AT POINT B =
SUM OF THE MOMENTS

DISTANCE FROM A TO B

FORCE

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923 Style Backstop

26' Attachment Height

STATIC EQUIVALENT LOADING FOR:

ON QUALITY SPORTS EQUIPMENT

IN BROADCAST, ILLINOIS 60155

www.porter-ath.com

7.2' 44# 1033# 589# 14.4' 1033 lbs 237 lbs 472 lbs 326 lbs 589 lbs 25.2' 676 lbs 616 lbs 60 lbs 0.7

264 lbs 47 lbs 329 lbs 2667 ft.lbs 237 ft.lbs 1806 ft.lbs 4710 ft.lbs

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

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

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

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

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

WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "A" =

DISTANCE TO MIDPOINT OF REAR BRACE X 2
DISTANCE TO MIDPOINT OF MAST X 2

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

DISTANCE TO MIDPOINT OF FRONT BRACE (DFB) X SEISMIC FACTOR X WEIGHT OF REAR BRACE (WFB) =

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

BACKSTOP'S TOTAL WEIGHT LOAD (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK)

VERTICAL REACTIONS AT POINT A:
WEIGHT LOAD AT POINT "A" + 2 SUPPORTS + SUM OF THE MOMENTS
DISTANCE BETWEEN SUPPORTS (A - A)

HORIZONTAL REACTION AT POINT A:
SUM OF THE MOMENTS
DISTANCE FROM A TO A

HOIST CABLE TENSION AT POINT A:
WEIGHT OF REAR BRACE + WEIGHT OF PULLEY + SEISMIC FACTOR
WEIGHT LOAD AT POINT "A" + SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF REAR BRACE X 2

HORIZONTAL REACTION AT POINT B:
SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS
WEIGHT OF PULLEY
SEISMIC MOMENT (MB) = SUM OF THE MOMENTS
WEIGHT LOAD AT POINT "A" X SEISMIC FACTOR
DISTANCE TO MIDPOINT OF BANK (DB) X 2

HOIST CABLE TENSION AT POINT B:
WEIGHT LOAD AT POINT "B" + SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF FRONT BRACE (DFB)

VERTICAL REACTION AT POINT A:
WEIGHT LOAD AT POINT "A" X 2 SUPPORTS

VERTICAL REACTION AT POINT B:
WEIGHT OF REAR BRACE + SEISMIC FACTOR X DISTANCE FROM A TO B

HORIZONTAL REACTION AT POINT B:
SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT B:
WEIGHT LOAD AT POINT "B" + SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT A:
WEIGHT LOAD AT POINT "A" + SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT B:
WEIGHT LOAD AT POINT "B" + SUM OF THE MOMENTS

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

BANK DOWN
HORIZONTAL REACTION AT POINT A:
WEIGHT LOAD AT POINT "A" X SEISMIC FACTOR
WEIGHT LOAD AT POINT "A" + SUM OF THE MOMENTS
DISTANCE BETWEEN SUPPORTS (A - A)

VERTICAL REACTION AT POINT A:
WEIGHT LOAD AT POINT "A" + 2 SUPPORTS + SUM OF THE MOMENTS
DISTANCE BETWEEN SUPPORTS (A - A)

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

BANK DOWN
HORIZONTAL REACTION AT POINT B:
WEIGHT LOAD AT POINT "B" X SEISMIC FACTOR
WEIGHT LOAD AT POINT "B" + SUM OF THE MOMENTS
DISTANCE BETWEEN SUPPORTS (A - B)

VERTICAL REACTION AT POINT B:
WEIGHT LOAD AT POINT "B" X 2 SUPPORTS

REATIONS FROM WEIGHT LOADS AND SEISMIC WITH BANK UP

BANK UP
HORIZONTAL REACTION AT POINT A:
WEIGHT LOAD AT POINT "A" X SEISMIC FACTOR
WEIGHT LOAD AT POINT "A" + SUM OF THE MOMENTS
DISTANCE BETWEEN SUPPORTS (A - A)

VERTICAL REACTION AT POINT A:
WEIGHT LOAD AT POINT "A" + SUM OF THE MOMENTS
DISTANCE FROM A TO A

HORIZONTAL REACTION AT POINT B:
SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS
WEIGHT OF PULLEY
SEISMIC MOMENT (MB) = SUM OF THE MOMENTS
WEIGHT LOAD AT POINT "B" X SEISMIC FACTOR
DISTANCE TO MIDPOINT OF BANK (DB) X 2

HOIST CABLE TENSION AT POINT B:
WEIGHT LOAD AT POINT "B" + SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF FRONT BRACE (DFB)

VERTICAL REACTION AT POINT B:
WEIGHT OF REAR BRACE + SEISMIC FACTOR X DISTANCE FROM A TO B

HORIZONTAL REACTION AT POINT B:
SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT B:
WEIGHT LOAD AT POINT "B" + SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT A:
WEIGHT LOAD AT POINT "A" + SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT B:
WEIGHT LOAD AT POINT "B" + SUM OF THE MOMENTS
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

WEIGHT LOAD AT POINT "A" = WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK
WEIGHT LOAD AT POINT "B" = WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7

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

DISTANCE TO MIDPOINT OF FRONT BRACE (DFB) X SEISMIC FACTOR X WEIGHT OF REAR BRACE (WFB) =

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

BACKSTOP’S TOTAL WEIGHT LOAD (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK) X SEISMIC FACTOR =

VERTICAL REACTIONS AT POINT A:

WEIGHT LOAD AT POINT "A"
2 SUPPORTS
± SUM OF THE MOMENTS
DISTANCE BETWEEN SUPPORTS (A-B)

VERTICAL REACTION AT POINT B:

WEIGHT OF REAR BRACE
2 SUPPORTS
± SUM OF THE MOMENTS
DISTANCE BETWEEN SUPPORTS (A-B)

HORIZONTAL REACTIONS AT POINT A:

SUM OF THE MOMENTS
DISTANCE FROM A TO B

HORIZONTAL REACTION AT POINT B:

SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF REAR BRACE X 2

HOIST CABLE TENSION AT POINT B:

SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF REAR BRACE X 2

HOIST CABLE TENSION AT POINT B:

SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF REAR BRACE X 2

WEIGHT LOAD AT POINT "A" = BACKSTOP’S TOTAL WEIGHT LOAD - HOIST CABLE TENSION

HOIST CABLE TENSION + WEIGHT LOAD AT POINT "A" = BACKSTOP’S TOTAL WEIGHT LOAD

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 CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD = 760 lbs.
WEIGHT LOAD AT POINT "A" = 718 lbs.
WEIGHT LOAD AT POINT "B" = 85 lbs.

WEIGHTS AND MOMENTS OF BACKSTOP ELEMENTS

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 0.7 (CHANGE WITH SEISMIC ZONE, RIGIDITY OF SUPPORTS & ROOM USE)

WEIGHT OF BANK (WB) = 298 lbs. X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF BANK (DB) = 347.7 lbs. SEISMIC MOMENT (MB) (FT.LBS.)
WEIGHT OF REAR BRACE (WRB) = 80 lbs. X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF REAR BRACE (DRB) = 88 lbs. SEISMIC MOMENT (MRB) (FT.LBS.)
WEIGHT OF MAST (WM) = 291 lbs. X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF MAST (DM) = 203 lbs. SEISMIC MOMENT (MM) (FT.LBS.)

MAXIMUM BENDING MOMENTS DUE TO BANKING

SEISMIC MOMENT (MB) = 347.7 lbs. SEISMIC MOMENT (MRB) = 88 lbs. SEISMIC MOMENT (MM) = 203 lbs.

WEIGHT OF REAR BRACE + WEIGHT OF PULLEY + WEIGHT OF MAST + WEIGHT OF BANK

DISTANCE TO MIDPOINT OF BANK (DB) X SEISMIC FACTOR X WEIGHT OF REAR BRACE (WFB) =
DISTANCE TO MIDPOINT OF MAST (DM) X SEISMIC FACTOR X WEIGHT OF MAST (WM) =
WEIGHT OF BANK (WB) X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF BANK (DB) =
BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR =

HORIZONTAL REACTIONS AT POINT A:
WEIGHT LOAD AT POINT "A" X 2 SUPPORTS = SUM OF THE MOMENTS

HORIZONTAL REACTIONS AT POINT B:
WEIGHT LOAD AT POINT "B" X 2 SUPPORTS = SUM OF THE MOMENTS

VERTICAL REACTIONS AT POINT A:
WEIGHT LOAD AT POINT "A" X 2 SUPPORTS = SUM OF THE MOMENTS

VERTICAL REACTIONS AT POINT B:
WEIGHT LOAD AT POINT "B" X 2 SUPPORTS = SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT B:
WEIGHT LOAD AT POINT "B" X 2 SUPPORTS + WEIGHT OF REAR BRACE = SUM OF THE MOMENTS

HOIST CABLE TENSION AT POINT A:
WEIGHT LOAD AT POINT "A" X 2 SUPPORTS + WEIGHT OF REAR BRACE = SUM OF THE MOMENTS

SUM OF THE MOMENTS = MB + MFB + MM

TOTAL WEIGHT LOAD OF BACKSTOP = WEIGHT LOAD AT POINT "A" + WEIGHT LOAD AT POINT "B"

STATIC EQUIVALENT LOADING FOR:
923 Style Backstop
29' Attachment Height

923 Style Backstop
29' Attachment Height
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD  
WEIGHT LOAD AT POINT "A"  
WEIGHT LOAD AT POINT "B"  

WEIGHT LOAD AT POINT "A" = WEIGHT OF REAR BRACE + WEIGHT OF BANK + WEIGHT OF MAST + WEIGHT OF PULLEY
WEIGHT LOAD AT POINT "B" = WEIGHT OF REAR BRACE + WEIGHT OF BANK + WEIGHT OF MAST + WEIGHT OF PULLEY

SEEK FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEEK FACTOR = 0.7

WEIGHT LOAD AT POINT "A" = WEIGHT LOAD AT POINT "A" x SEEK FACTOR
WEIGHT LOAD AT POINT "B" = WEIGHT LOAD AT POINT "B" x SEEK FACTOR

DISTANCE TO MIDPOINT OF REAR BRACE (DFB) X SEEK FACTOR X WEIGHT OF REAR BRACE (WFRB) =
DISTANCE TO MIDPOINT OF MAST (DM) X SEEK FACTOR X WEIGHT OF MAST (WM) =
WEIGHT OF BANK (WB) X SEEK FACTOR X DISTANCE TO MIDPOINT OF BANK (DB) =

BACKSTOP'S TOTAL WEIGHT LOAD = WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK

VERTICAL REACTIONS AT POINT A:
WEIGHT LOAD AT POINT "A"  
2 SUPPORTS

SUM OF THE MOMENTS = MB + MFB + MM

HORIZONTAL REACTION AT POINT A:
SUM OF THE MOMENTS = MB + MFB + MM

VERTICAL REACTIONS AT POINT B:
WEIGHT OF REAR BRACE  
2 SUPPORTS

SUM OF THE MOMENTS = MB + MFB + MM

HORIZONTAL REACTION AT POINT B:
SUM OF THE MOMENTS = MB + MFB + MM

HOIST CABLE TENSION AT POINT A:
3/BOARDS

SUM OF THE MOMENTS = MB + MFB + MM

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

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

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

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

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

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

BACKSTOP'S TOTAL WEIGHT LOAD = RFD x WEIGHT OF REAR BRACE + WEIGHT OF FRONT BRACE + WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "A" = RFD x WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "B" = RFD x WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS

SEISMIC FACTOR = 1.5

WEIGHT OF BANK (WB) X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF BANK (DB) = WB + WRB + WM

DISTANCE TO MIDPOINT OF MAST (DM) X SEISMIC FACTOR X WEIGHT OF MAST (WM) = SEISMIC MOMENT (MM) (FT.LBS.)

WEIGHT OF BANK (WB) X SEISMIC FACTOR = SEISMIC MOMENT (MB) (FT.LBS.)

WEIGHT OF REAR BRACE X 2 = SEISMIC MOMENT (MRB) (FT.LBS.)

BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR = BACKSTOP'S TOTAL MOMENT (MRB) (FT.LBS.)

SEISMIC FACTORED MOMENTS AND SUM OF MOMENTS FOR BACKSTOP ELEMENTS (VARIES WITH SEISMIC ZONE, RIGIDITY OF SUPPORT & ROOM USE)

WEIGHT OF PULLEY

WEIGHT OF REAR BRACE + WEIGHT OF PULLEY

WEIGHT LOAD AT POINT "A" = SUM OF THE MOMENTS - DISTANCE FROM A TO A

WEIGHT LOAD AT POINT "B" = SUM OF THE MOMENTS - DISTANCE TO MIDPOINT OF REAR BRACE X 2

WEIGHT LOAD + HOIST CABLE TENSION = BACKSTOP'S TOTAL WEIGHT LOAD - HOIST CABLE TENSION

HORIZONTAL REACTION AT POINT A:

HORIZONTAL REACTION AT POINT B:

VERTICAL REACTION AT POINT A:

VERTICAL REACTION AT POINT B:

HOIST CABLE TENSION AT POINT A:

HOIST CABLE TENSION AT POINT B:

HOIST CABLE TENSION AT POINT A = BACKSTOP'S TOTAL WEIGHT LOAD - HOIST CABLE TENSION

HOIST CABLE TENSION AT POINT B = BACKSTOP'S TOTAL WEIGHT LOAD - HOIST CABLE TENSION

HOIST CABLE TENSION AT POINT A = BACKSTOP'S TOTAL WEIGHT LOAD - HOIST CABLE TENSION

HOIST CABLE TENSION AT POINT B = BACKSTOP'S TOTAL WEIGHT LOAD - HOIST CABLE TENSION

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

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

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

REATIONS AT HINGE LINE AT POINT B FROM WEIGHT LOADS AND SEISMIC PERPENDICULAR TO BANK (FIG. 2)
WEIGHT LOAD CALCULATIONS (WITH BANK DOWN)

BACKSTOP'S TOTAL WEIGHT LOAD = 313 lb. (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK)
WEIGHT LOAD AT POINT 'A' = 155 lb. (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK)
WEIGHT LOAD AT POINT 'B' = 58 lb. (WEIGHT OF REAR BRACE + WEIGHT OF MAST)

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) X SEISMIC FACTOR X DISTANCE TO MIDPOINT OF BANK (DB) =
DISTANCE TO MIDPOINT OF REAR BRACE (DRB) X SEISMIC FACTOR X WEIGHT OF REAR BRACE (WRB)
DISTANCE TO MIDPOINT OF MAST (DM) X SEISMIC FACTOR X WEIGHT OF MAST (WM)

BACKSTOP'S TOTAL WEIGHT LOAD X SEISMIC FACTOR

VERTICAL REACTIONS AT POINT 'A':
WEIGHT LOAD AT POINT 'A' = 155 lb. (WEIGHT OF REAR BRACE + WEIGHT OF MAST + WEIGHT OF BANK)
2 SUPPORTS
± SUM OF THE MOMENTS
DISTANCE BETWEEN SUPPORTS (A - A)

HORIZONTAL REACTION AT POINT 'A':
SUM OF THE MOMENTS
DISTANCE FROM A TO A

VERTICAL REACTION AT POINT 'B':
WEIGHT OF REAR BRACE = 293 lb.
2 SUPPORTS
± SUM OF THE MOMENTS
DISTANCE BETWEEN SUPPORTS (A - B)

HORIZONTAL REACTION AT POINT 'B':
SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF REAR BRACE (DRB)

HOIST CABLE TENSION AT POINT 'B' = SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF REAR BRACE (DRB)

FORCE VECTORS PERPENDICULAR TO BANK FIGURE 1
FORCE VECTORS PARALLEL TO BANK FIGURE 2

HOIST CABLE TENSION AT POINT 'A'
WEIGHT LOAD AT POINT 'A'
2 SUPPORTS
± SUM OF THE MOMENTS
DISTANCE BETWEEN SUPPORTS (A - A)

HORIZONTAL REACTION AT POINT 'A':
SUM OF THE MOMENTS
DISTANCE FROM A TO A

VERTICAL REACTION AT POINT 'B':
WEIGHT OF REAR BRACE = 293 lb.
2 SUPPORTS
± SUM OF THE MOMENTS
DISTANCE BETWEEN SUPPORTS (A - B)

HORIZONTAL REACTION AT POINT 'B':
SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF REAR BRACE (DRB)

HOIST CABLE TENSION AT POINT 'B' = SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF REAR BRACE (DRB)

FORCE VECTORS PERPENDICULAR TO BANK FIGURE 1
FORCE VECTORS PARALLEL TO BANK FIGURE 2

HOIST CABLE TENSION AT POINT 'A'
WEIGHT LOAD AT POINT 'A'
2 SUPPORTS
± SUM OF THE MOMENTS
DISTANCE BETWEEN SUPPORTS (A - A)

HORIZONTAL REACTION AT POINT 'A':
SUM OF THE MOMENTS
DISTANCE FROM A TO A

VERTICAL REACTION AT POINT 'B':
WEIGHT OF REAR BRACE = 293 lb.
2 SUPPORTS
± SUM OF THE MOMENTS
DISTANCE BETWEEN SUPPORTS (A - B)

HORIZONTAL REACTION AT POINT 'B':
SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF REAR BRACE (DRB)

HOIST CABLE TENSION AT POINT 'B' = SUM OF THE MOMENTS
DISTANCE TO MIDPOINT OF REAR BRACE (DRB)