SECTION B

WIRE-ROPE CABLE INTERMEDIATE RAILING PASS-THROUGH RESISTANCE TO 4" SPHERE

B.1—INTRODUCTION

These calculations check the resistance of wire-rope cable intermediate railings to pass-through of a 4" diameter sphere as required by 2006 IBC / 2007 CBC 1013.3.

The sphere is loaded perpendicular to the plane and at the mid-span of the infill cables. Contact between the sphere and the cables is assumed to be frictionless.

The sphere is successfully resisted if the cable deflection and spread reaches an equilibrium with the applied force before the cables are spread far enough apart to allow the sphere to pass through.

The equations used in these calculations are derived in Section A.

B.2—CHECKS FOR 1/8" WIRE ROPE CABLE @ 3.08" SPACING

Diameter of Cable:	$D := 0.125 \cdot in$	Cable Spacing:	$S_o := 3.08 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 325 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.125\,in$

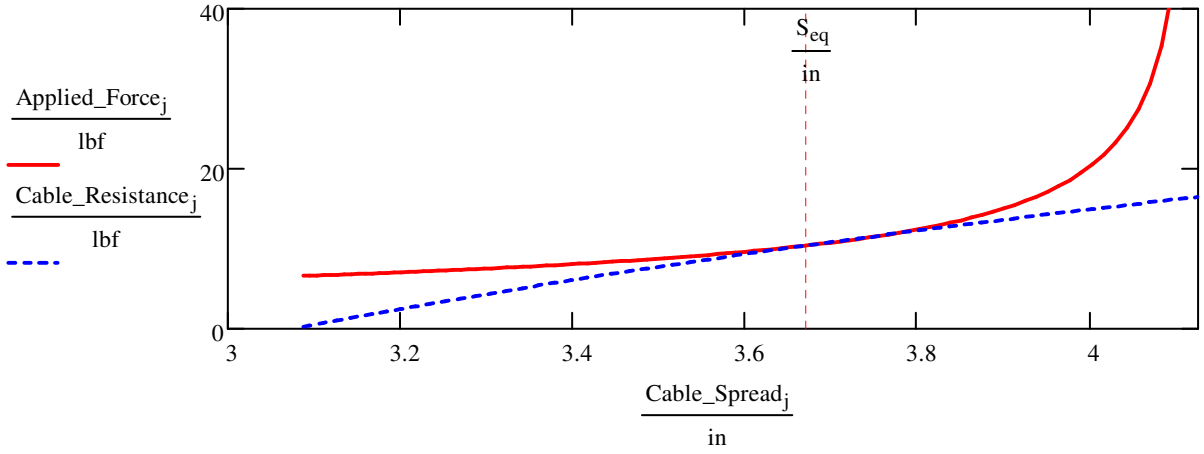
Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.522\,in$

Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.332\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 327.7\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.671\,in$

$\frac{S_{eq}}{S_{max}} = 0.89$ ***If < 1.0, System reaches equilibrium and is GOOD***



SUCCESSFULLY RESISTS SPHERE

B.3—CHECKS FOR 1/8" WIRE ROPE CABLE @ 3.1" SPACING

Diameter of Cable:	$D := 0.125 \cdot in$	Cable Spacing:	$S_o := 3.1 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 400 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.125\,in$

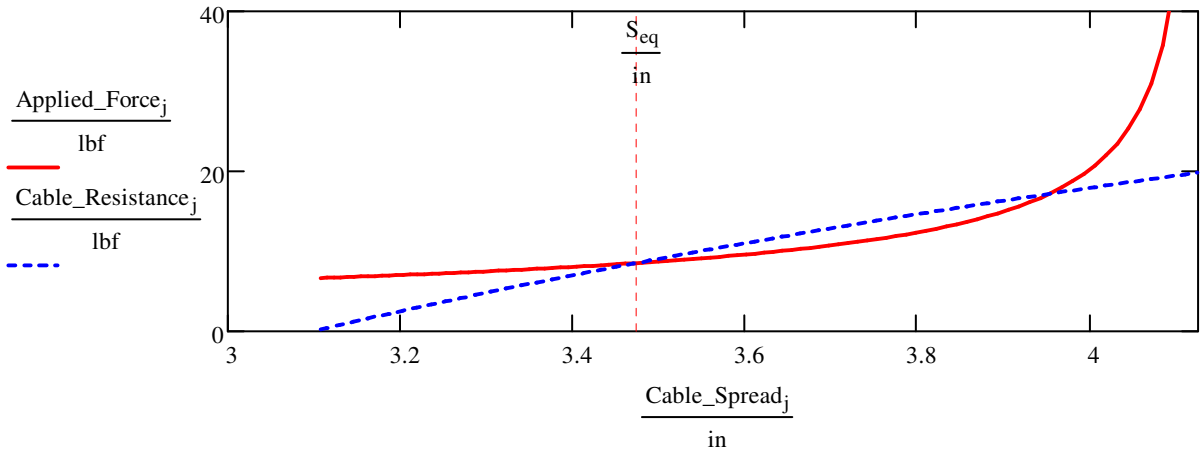
Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.512\,in$

Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.222\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 401.8\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.474\,in$

$\frac{S_{eq}}{S_{max}} = 0.842$ ***If < 1.0, System reaches equilibrium and is GOOD***



SUCCESSFULLY RESISTS SPHERE

B.4—CHECKS FOR 3/16" WIRE ROPE CABLE @ 3.08" SPACING

Diameter of Cable:	$D := 0.1875 \cdot in$	Cable Spacing:	$S_o := 3.08 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 325 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.188\,in$

Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.554\,in$

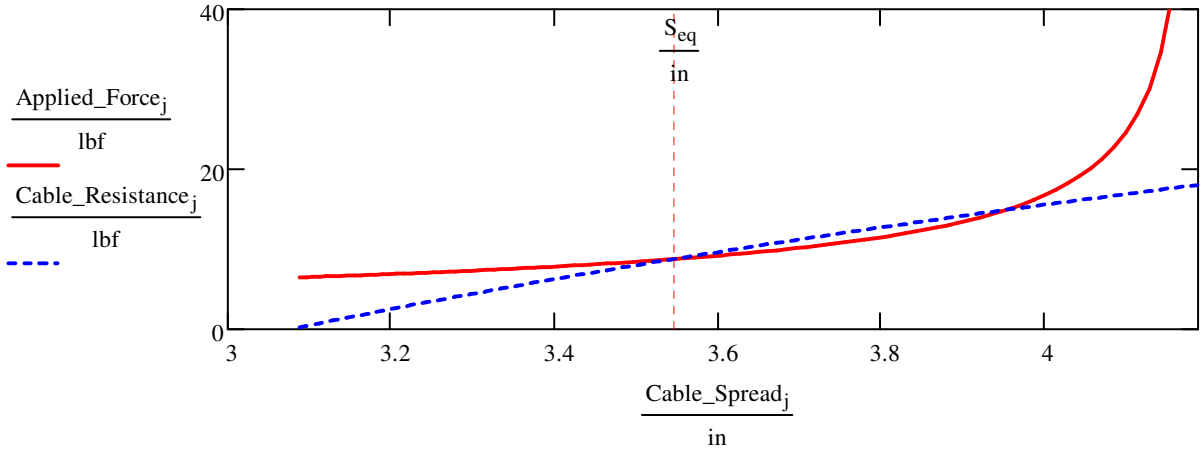
Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.276\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 332.8\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.547\,in$

$\frac{S_{eq}}{S_{max}} = 0.847$

If < 1.0, System reaches equilibrium and is GOOD



SUCCESSFULLY RESISTS SPHERE

B.5—CHECKS FOR 3/16" WIRE ROPE CABLE @ 3.1" SPACING

Diameter of Cable:	$D := 0.1875 \cdot in$	Cable Spacing:	$S_o := 3.1 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 400 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.188\,in$

Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.544\,in$

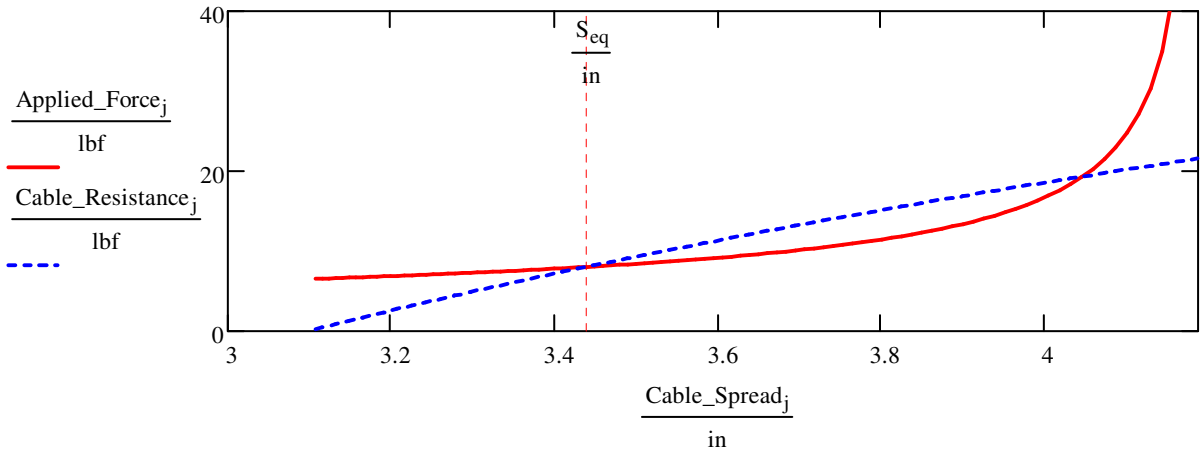
Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.206\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 406.6\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.439\,in$

$\frac{S_{eq}}{S_{max}} = 0.821$

If < 1.0, System reaches equilibrium and is GOOD



SUCCESSFULLY RESISTS SPHERE

B.6—CHECKS FOR 3/16" WIRE ROPE CABLE @ 3.25" SPACING

Diameter of Cable:	$D := 0.1875 \cdot in$	Cable Spacing:	$S_o := 3.25 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 400 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.188\,in$

Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.469\,in$

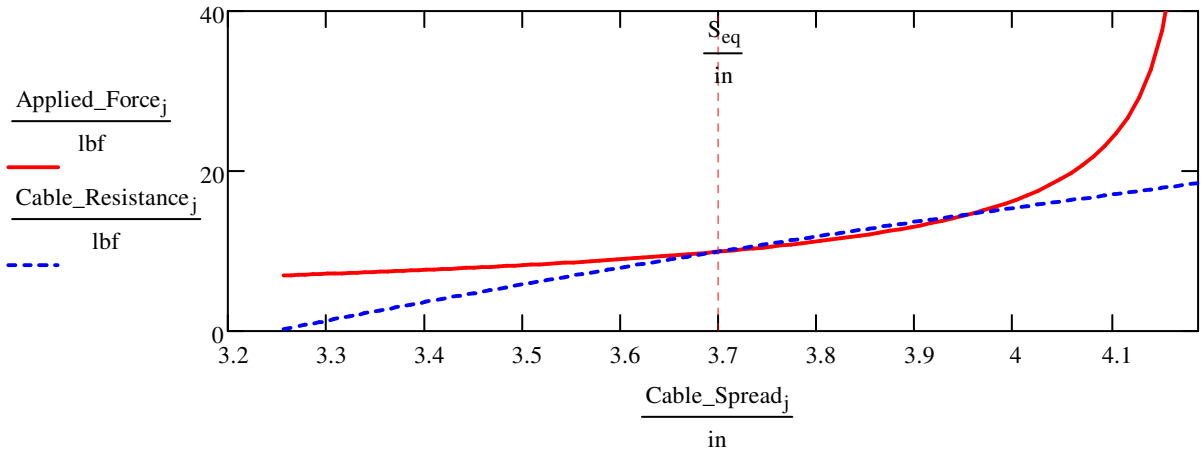
Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.254\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 407.4\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.699\,in$

$\frac{S_{eq}}{S_{max}} = 0.883$

If < 1.0, System reaches equilibrium and is GOOD



SUCCESSFULLY RESISTS SPHERE

B.7—CHECKS FOR 1/4" WIRE ROPE CABLE @ 3.08" SPACING

Diameter of Cable:	$D := 0.25 \cdot in$	Cable Spacing:	$S_o := 3.08 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 325 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.25\,in$

Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.585\,in$

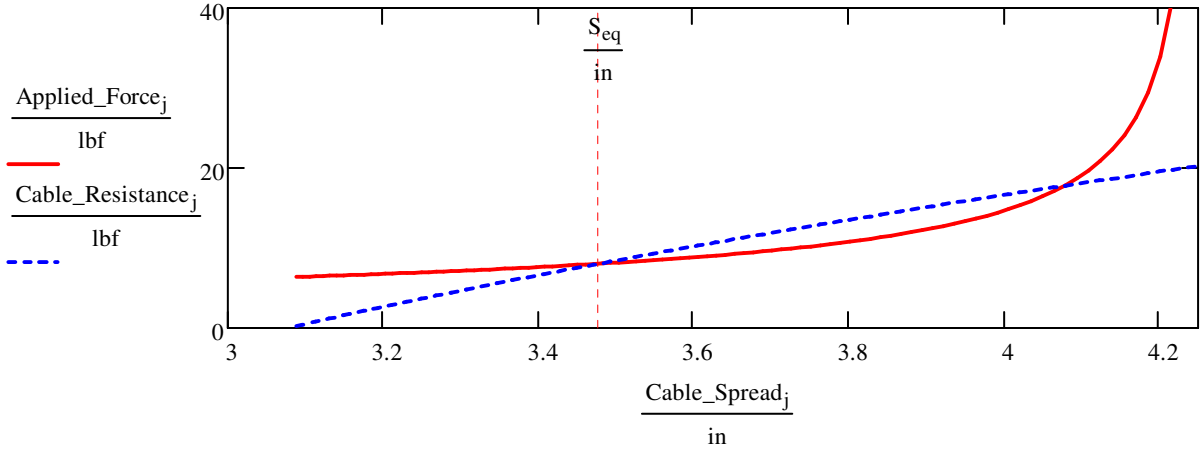
Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.244\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 344.7\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.479\,in$

$\frac{S_{eq}}{S_{max}} = 0.819$

If < 1.0, System reaches equilibrium and is GOOD



SUCCESSFULLY RESISTS SPHERE

B.8—CHECKS FOR 1/4" WIRE ROPE CABLE @ 3.1" SPACING

Diameter of Cable:	$D := 0.25 \cdot in$	Cable Spacing:	$S_o := 3.1 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 400 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.25\,in$

Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.575\,in$

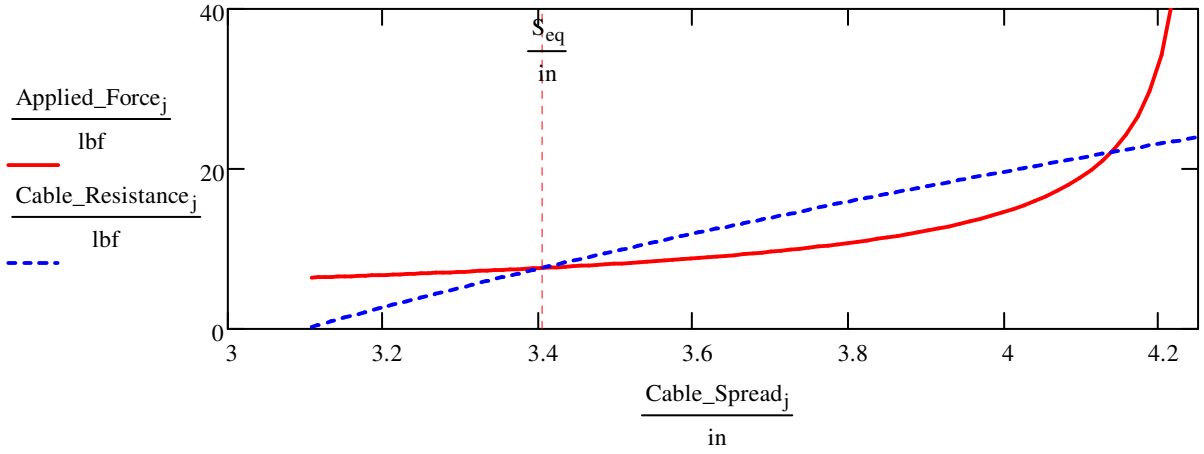
Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.19\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 418.2\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.405\,in$

$\frac{S_{eq}}{S_{max}} = 0.801$

If < 1.0, System reaches equilibrium and is GOOD



SUCCESSFULLY RESISTS SPHERE

B.9—CHECKS FOR 1/4" WIRE ROPE CABLE @ 3.25" SPACING

Diameter of Cable:	$D := 0.25 \cdot in$	Cable Spacing:	$S_o := 3.25 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 400 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.25\,in$

Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.5\,in$

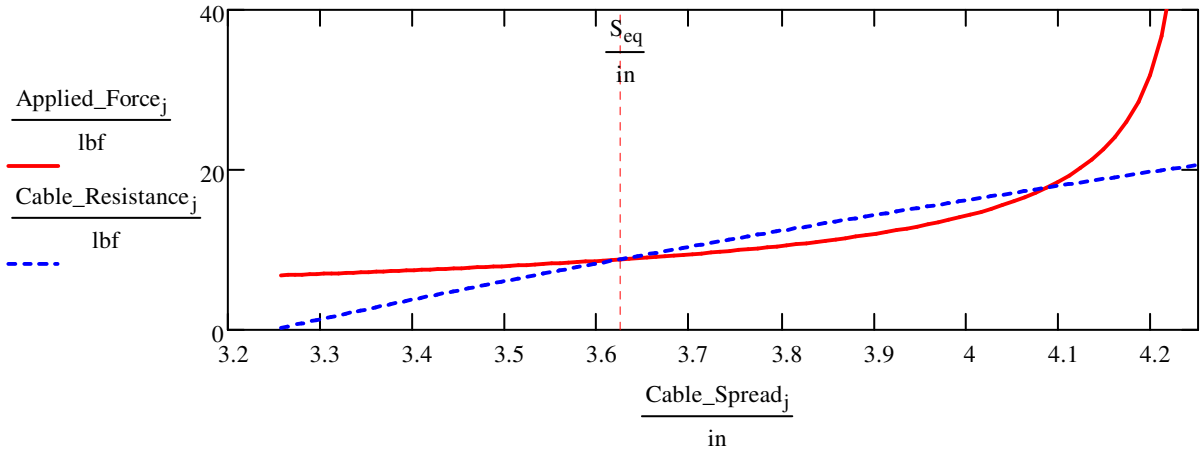
Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.22\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 419\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.624\,in$

$\frac{S_{eq}}{S_{max}} = 0.853$

If < 1.0, System reaches equilibrium and is GOOD



SUCCESSFULLY RESISTS SPHERE

B.10—CHECKS FOR 1/4" WIRE ROPE CABLE @ 3.36" SPACING

Diameter of Cable:	$D := 0.25 \cdot in$	Cable Spacing:	$S_o := 3.36 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 400 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.25\,in$

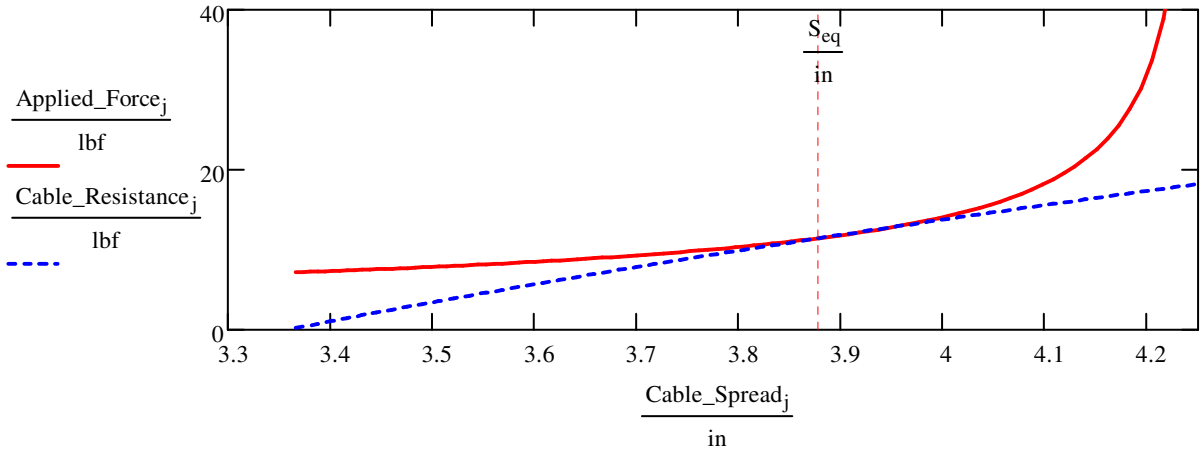
Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.445\,in$

Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.285\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 421.1\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.88\,in$

$\frac{S_{eq}}{S_{max}} = 0.913$ ***If < 1.0, System reaches equilibrium and is GOOD***



SUCCESSFULLY RESISTS SPHERE

B.11—CHECKS FOR 5/16" WIRE ROPE CABLE @ 3.08" SPACING

Diameter of Cable:	$D := 0.3125 \cdot in$	Cable Spacing:	$S_o := 3.08 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 325 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.313\,in$

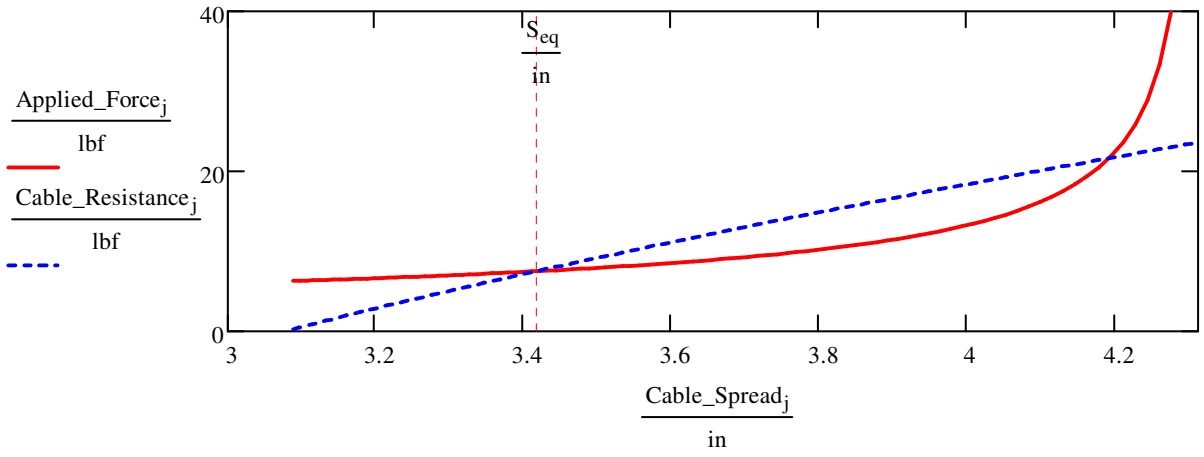
Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.616\,in$

Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.213\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 368.4\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.417\,in$

$\frac{S_{eq}}{S_{max}} = 0.792$ ***If < 1.0, System reaches equilibrium and is GOOD***



SUCCESSFULLY RESISTS SPHERE

B.12—CHECKS FOR 5/16" WIRE ROPE CABLE @ 3.1" SPACING

Diameter of Cable:	$D := 0.3125 \cdot in$	Cable Spacing:	$S_o := 3.1 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 400 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.313\,in$

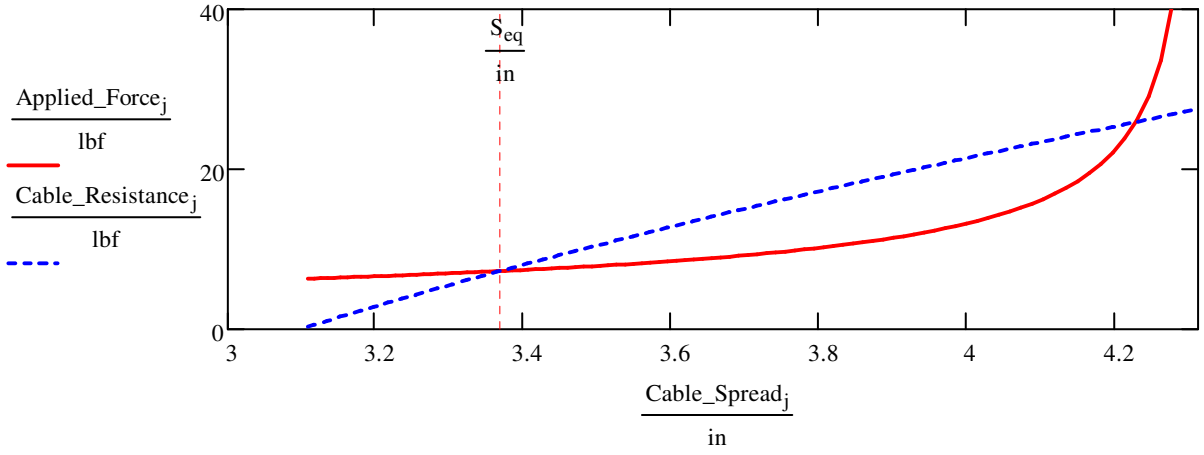
Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.606\,in$

Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.172\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 441.8\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.368\,in$

$\frac{S_{eq}}{S_{max}} = 0.781$ ***If < 1.0, System reaches equilibrium and is GOOD***



SUCCESSFULLY RESISTS SPHERE

B.13—CHECKS FOR 5/16" WIRE ROPE CABLE @ 3.25" SPACING

Diameter of Cable:	$D := 0.3125 \cdot in$	Cable Spacing:	$S_o := 3.25 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 400 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.313\,in$

Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.531\,in$

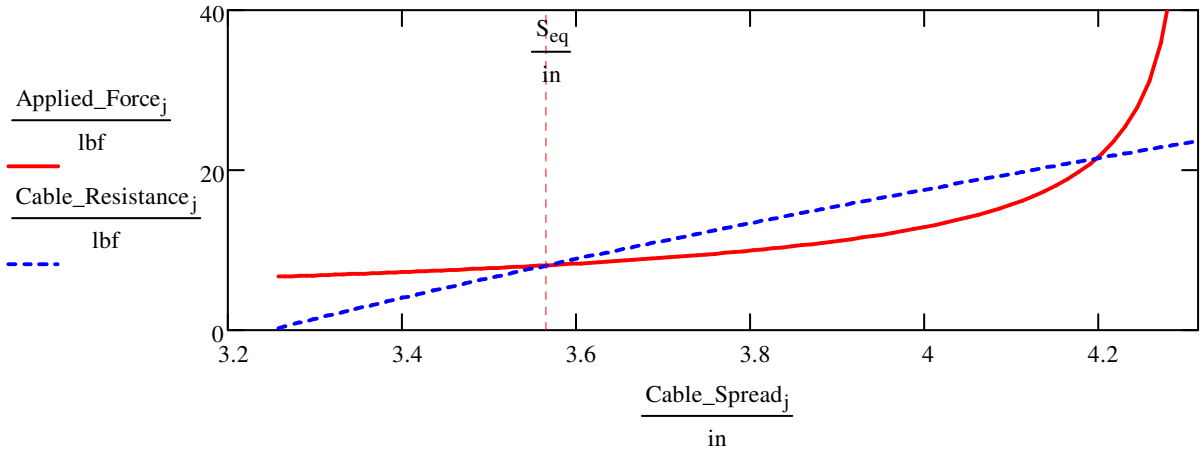
Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.192\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 442.5\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.567\,in$

$\frac{S_{eq}}{S_{max}} = 0.827$

If < 1.0, System reaches equilibrium and is GOOD



SUCCESSFULLY RESISTS SPHERE

B.14—CHECKS FOR 5/16" WIRE ROPE CABLE @ 3.36" SPACING

Diameter of Cable:	$D := 0.3125 \cdot in$	Cable Spacing:	$S_o := 3.36 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 400 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.313\,in$

Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.476\,in$

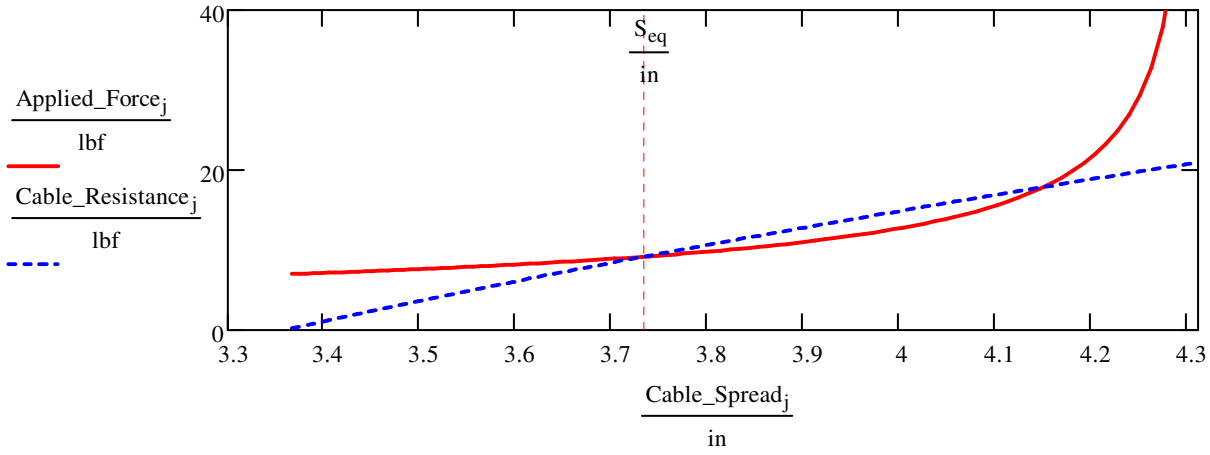
Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.216\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 443.5\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.735\,in$

$\frac{S_{eq}}{S_{max}} = 0.866$

If < 1.0, System reaches equilibrium and is GOOD



SUCCESSFULLY RESISTS SPHERE

B.15—CHECKS FOR 3/8" WIRE ROPE CABLE @ 3.08" SPACING

Diameter of Cable:	$D := 0.375 \cdot in$	Cable Spacing:	$S_o := 3.08 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 325 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.375\,in$

Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.648\,in$

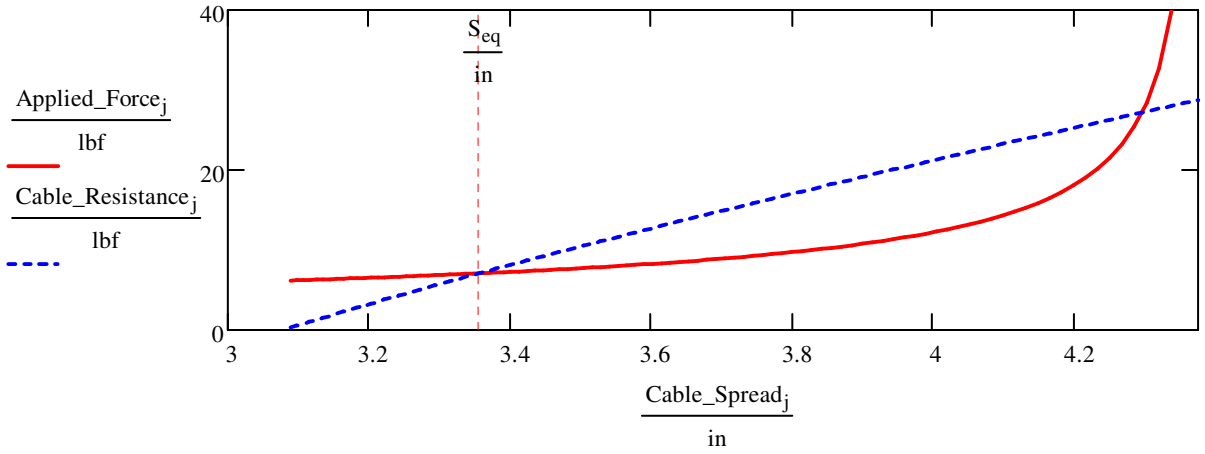
Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.18\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 410.3\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.357\,in$

$\frac{S_{eq}}{S_{max}} = 0.767$

If < 1.0, System reaches equilibrium and is GOOD



SUCCESSFULLY RESISTS SPHERE

B.16—CHECKS FOR 3/8" WIRE ROPE CABLE @ 3.1" SPACING

Diameter of Cable:	$D := 0.375 \cdot in$	Cable Spacing:	$S_o := 3.1 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 400 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.375\,in$

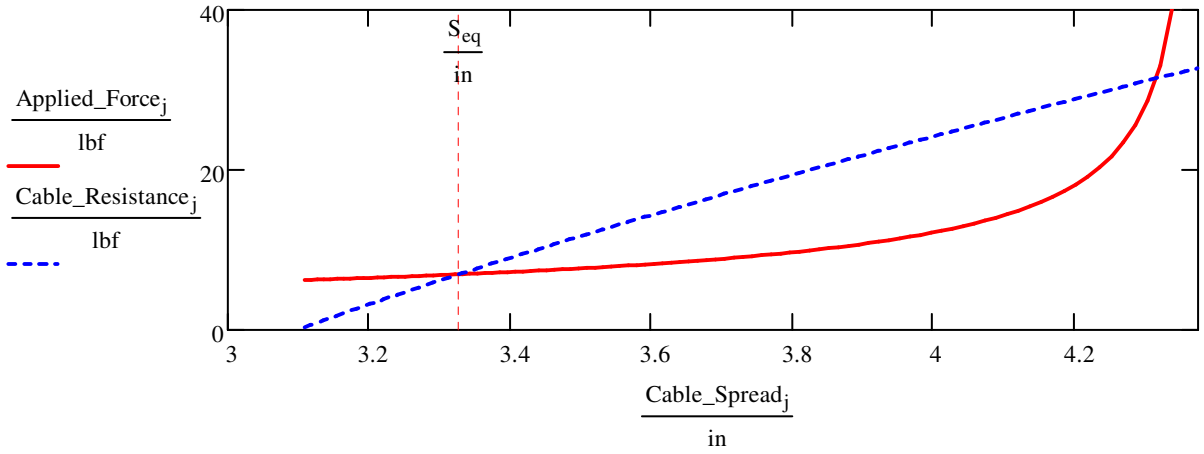
Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.638\,in$

Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.15\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 483.8\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.328\,in$

$\frac{S_{eq}}{S_{max}} = 0.761$ ***If < 1.0, System reaches equilibrium and is GOOD***



SUCCESSFULLY RESISTS SPHERE

B.17—CHECKS FOR 3/8" WIRE ROPE CABLE @ 3.25" SPACING

Diameter of Cable:	$D := 0.375 \cdot in$	Cable Spacing:	$S_o := 3.25 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 400 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.375\,in$

Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.563\,in$

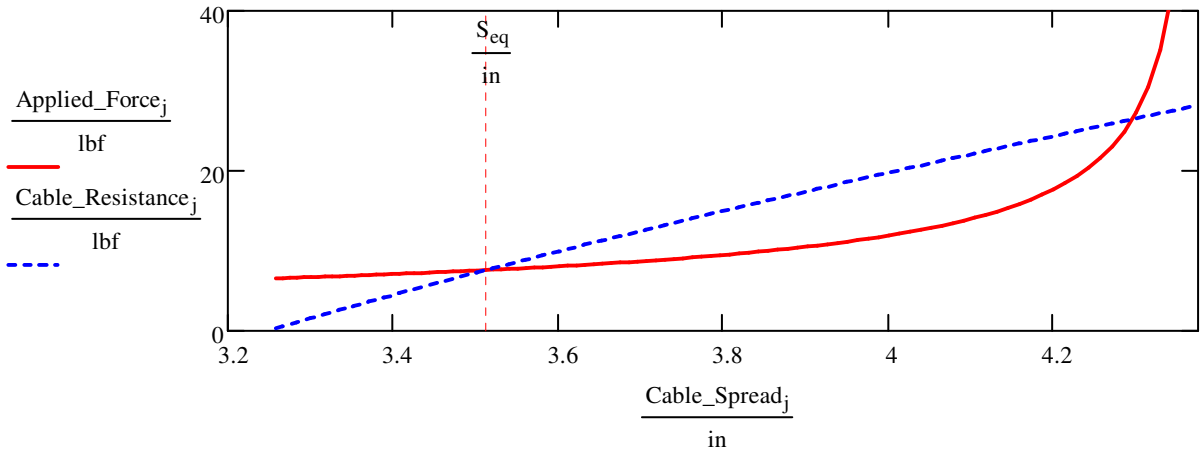
Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.164\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 484.5\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.513\,in$

$\frac{S_{eq}}{S_{max}} = 0.803$

If < 1.0, System reaches equilibrium and is GOOD



SUCCESSFULLY RESISTS SPHERE

B.18—CHECKS FOR 3/8" WIRE ROPE CABLE @ 3.36" SPACING

Diameter of Cable:	$D := 0.375 \cdot in$	Cable Spacing:	$S_o := 3.36 \cdot in$
Support Spacing:	$L := 42 \cdot in$	Anchor Spacing:	$L_T := 50 \cdot ft$
Prestress Force:	$F_{ps} := 400 \cdot lbf$		
Sphere Diameter:	$D_b := 4 \cdot in$	Load on Sphere	$F_x := 8.7 \cdot lbf$

Spread at Pass-Thru: $S_{max} := D_b + D$ $S_{max} = 4.375\,in$

Deflection at Pass-Thru: $\Delta'_{max} := \frac{S_{max} - S_o}{2}$ $\Delta'_{max} = 0.508\,in$

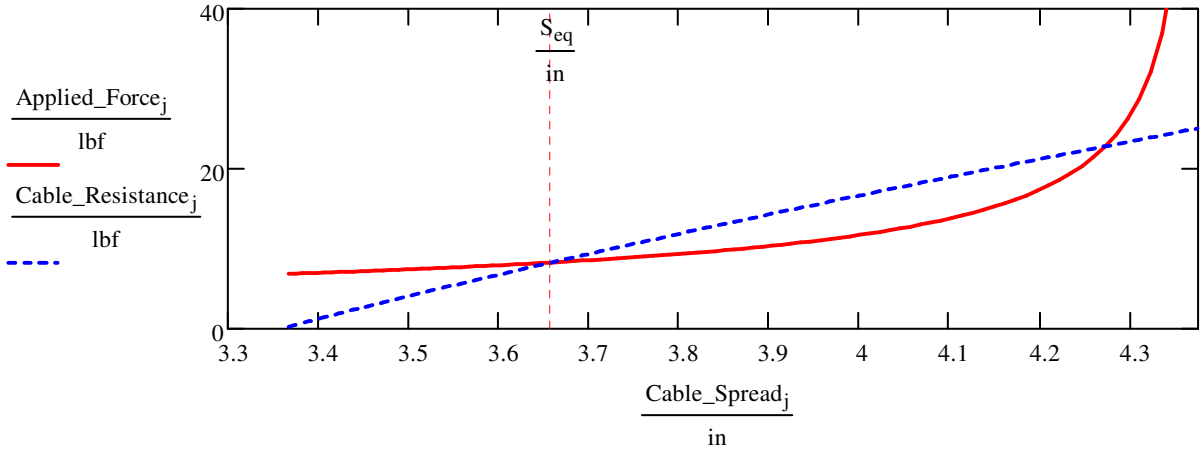
Deflection at Equilibrium: $\Delta'_{eq} := \Delta_{eq}(F_x, D_b, D, S_o, \Delta_{max}(D, D_b, S_o), L, L_T, F_{ps})$ $\Delta'_{eq} = 0.178\,in$

Cable Anchor Reaction: $R_x := \frac{F(F_x, \Delta'_{eq}, D, D_b, S_o) \cdot L}{4 \cdot \Delta'_{eq}}$ $R_x = 485.2\,lbf$

Spread at Equilibrium: $S_{eq} := \frac{S_o \cdot S_{max}}{S_{max} - 2 \cdot \Delta'_{eq}}$ $S_{eq} = 3.659\,in$

$\frac{S_{eq}}{S_{max}} = 0.836$

If < 1.0, System reaches equilibrium and is GOOD



SUCCESSFULLY RESISTS SPHERE

— END OF SECTION B —