DD Vari Loop

Adjustable line loop

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Introduction

Definition:

The **DD Vari Loop** is a line / cord / rope loop, that can be adjusted in length. The length is continuously **Vari**able.

“DD” Stands for the fact that this loop is able to carry double the load of a traditional “Whoopie-Sling”.
It has **D**ouble **D**urability (DD).

Application:

Variable loops are widely used for static suspension, for example as suspension for Hammocks and Tarps

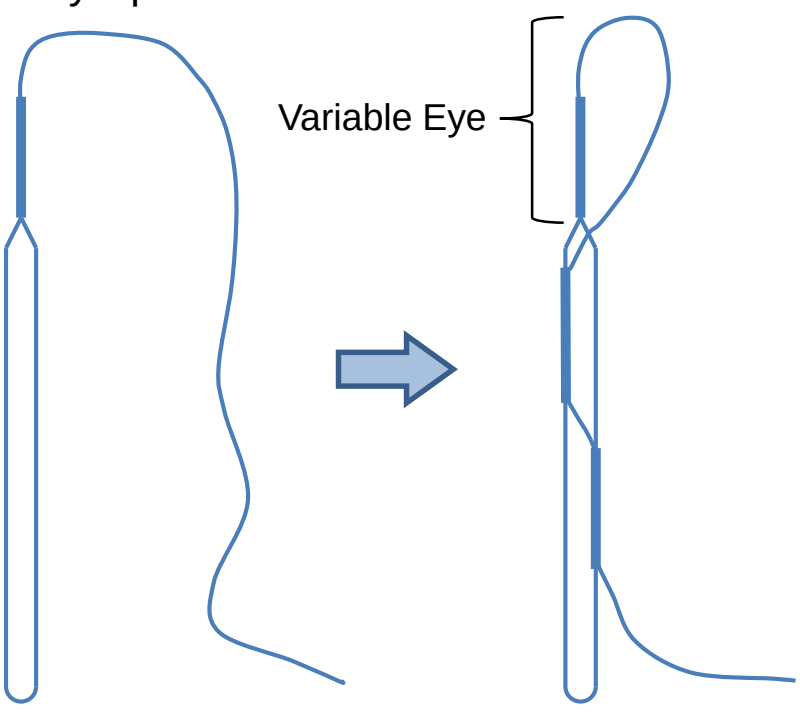
Features:

- The double strength allows to use a line (rope) with smaller diameter to carry the same load as a traditional “Whoopie-Sling”
- The smaller line diameter leads to shorter minimum length which gives more flexibility in the use of the DD Vari Loop
- The smaller diameter reduces the weight of line itself
- The packing size is reduced.

Basic Construction

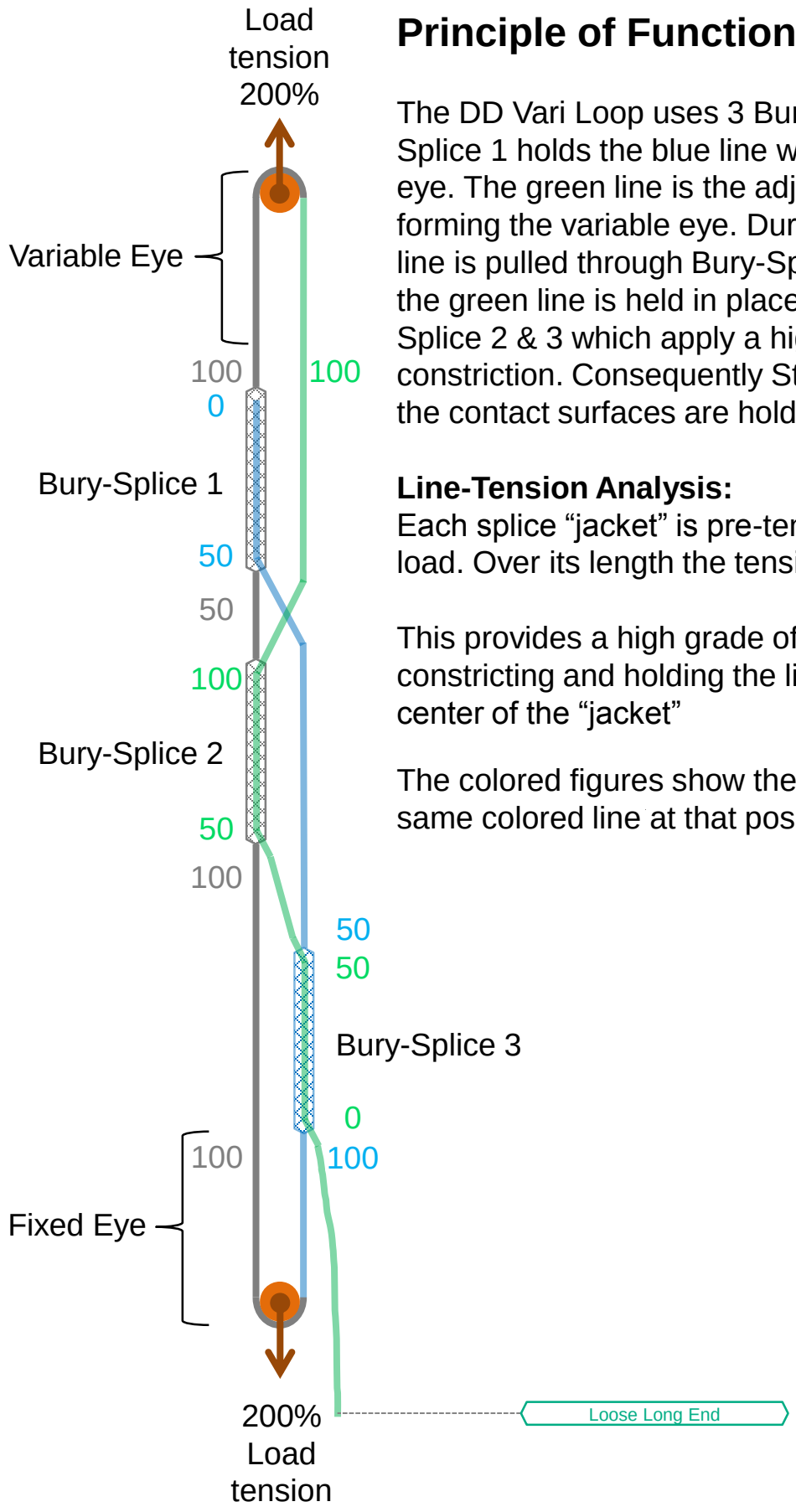
Long fixed eye with Brummel Lock and Bury Splice

DD Vari Loop



Basically a long fixed eye is modified with two extra bury-splices, transforming it into a DD Vari Loop

DD Vari Loop
made form 2.5mm
Dyneema cord
(Liros D-Pro)



Principle of Function

The DD Vari Loop uses 3 Bury-Splice sections. Bury-Splice 1 holds the blue line which is forming the fixed eye. The green line is the adjustable one and is forming the variable eye. During adjustment the green line is pulled through Bury-Splice 2 & 3. During load the green line is held in place by the jackets of Bury-Splice 2 & 3 which apply a high amount of constriction. Consequently Sticking-Friction-Forces on the contact surfaces are holding the line in place

Line-Tension Analysis:
Each splice “jacket” is pre-tensioned with ~50% of load. Over its length the tension is increasing to 100%

This provides a high grade of reliability regarding constricting and holding the line which is inside the center of the “jacket”

The colored figures show the tension in the related same colored line at that position.

How to make a DD Vari Loop

The next slides will show in detail the essential working steps to cerate a DD Vari Loop

a) Define dimensions of line and loop

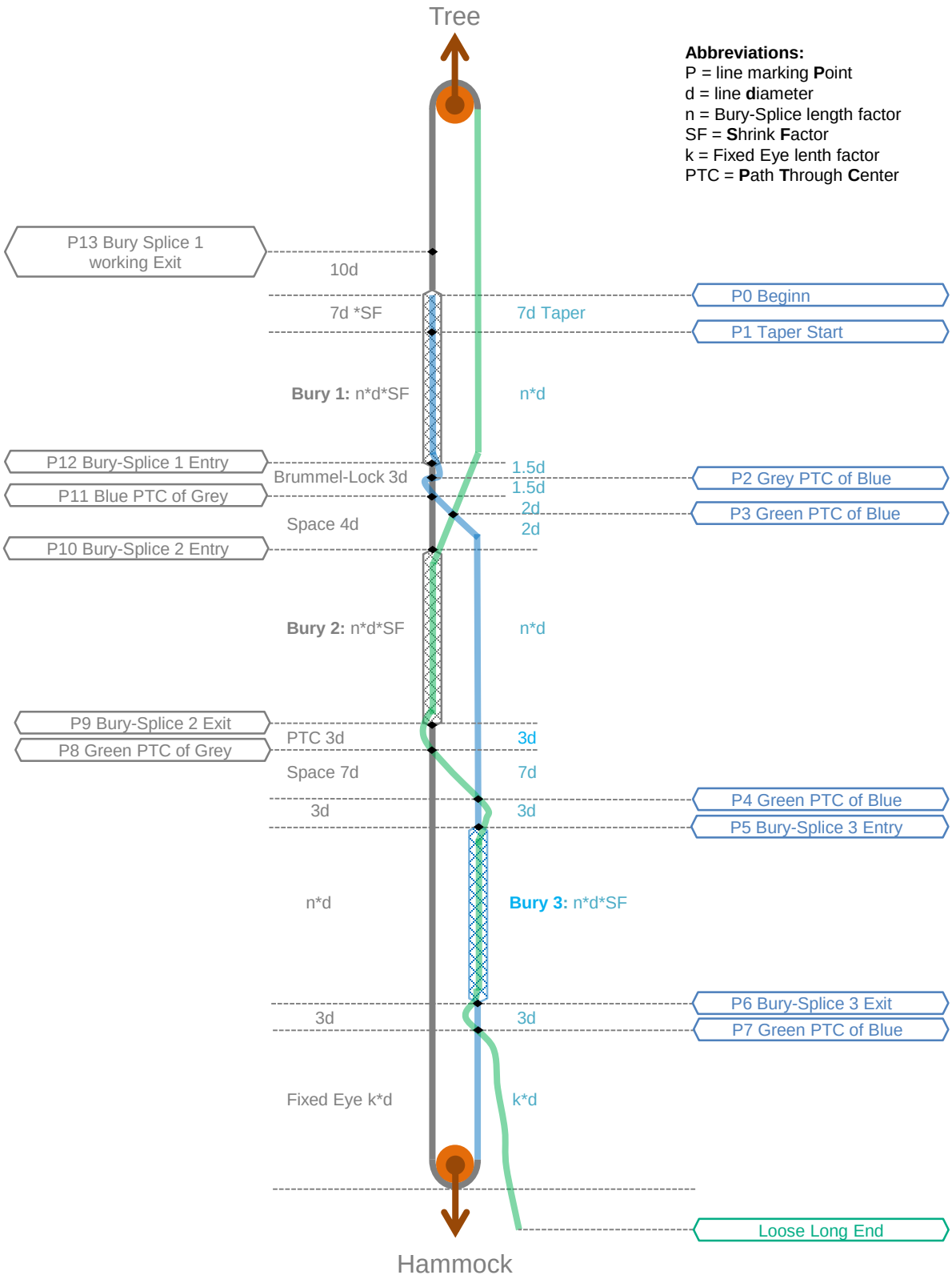
b) Calculate the marking positions

c) Mark the line

d) Splice the line at marked positions

Definition of Dimensions

This is the basis for calculation of line marking points “P” (small black diamonds)



a) Define dimensions of line and loop
b) Calculate the marking positions (automatically)

- Define Line Diameter "d“ in mm or inch
- Define Bury- Splice length "n“. For Dyneema® line it should be min 40 and max 100 line diameters “d”
- Define Fixed Eye length “L”
- Define Bury-Splice Shrink Factor "SF“
- Define the maximum total loop length
- Enter defined figures into green cells of below Table or open separate Excel Document

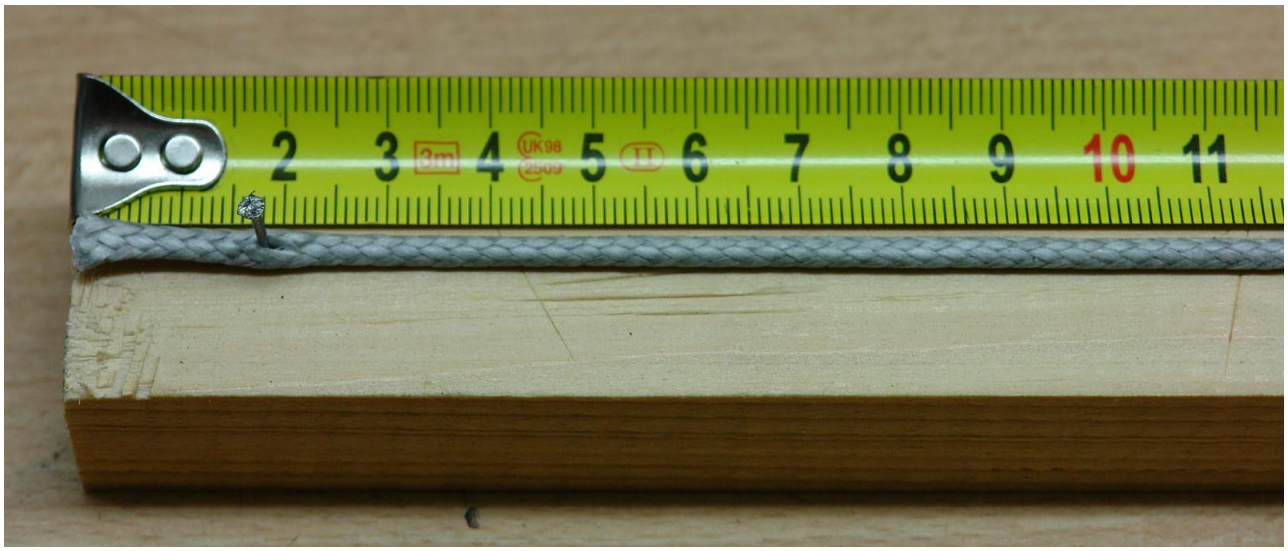
DD Vari-Loop Calculator			
Line Diameter d =		2.5	mm
Bury-Splice Length Factor n =		40	Line Diameters
Bury-Splice Shrink Factor SF =		1.14	
Fixed Eye Length L =		60	mm
Maximum total Loop Length =		1750	mm
Info: Bury-Splice Length =		100	mm
Info: Minimum Loop Length=		367.5	mm
Info: Needed Line total=		3987	mm
Marking Points			
Point	**Description**	**Position**	
P0	Beginn	0	mm
P1	Taper Start	17.5	mm
P2	Grey PTC of Blue	121.25	mm
P3	Green PTC of Blue	130	mm
P4	Green PTC of Blue	260	mm
P5	Bury-Splice 3 Entry	267.5	mm
P6	Bury-Splice 3 Exit	381.5	mm
P7	Green PTC of Blue	389	mm
P8	Green PTC of Grey	641.5	mm
P9	Bury-Splice 2 Exit	649	mm
P10	Bury-Splice 2 Entry	763	mm
P11	Blue PTC of Grey	773	mm
P12	Bury-Splice 1 Entry	780.5	mm
P13	Bury Splice 1 working Exit	937	mm

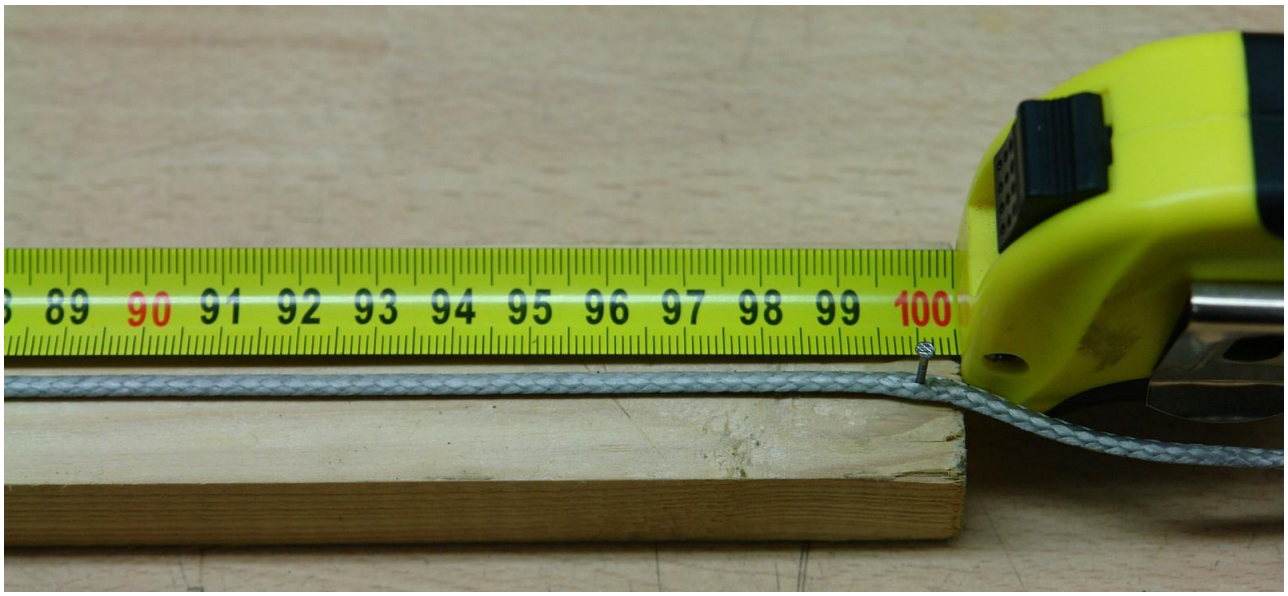
- Get a braided line, a ruler and a felt pen with a thin tip
- Mark the braided line at the calculated positions P1 to P13 Make sure the marking goes all around the circumference of line

c) Mark the line

Attach a measuring tape to a wooden slat

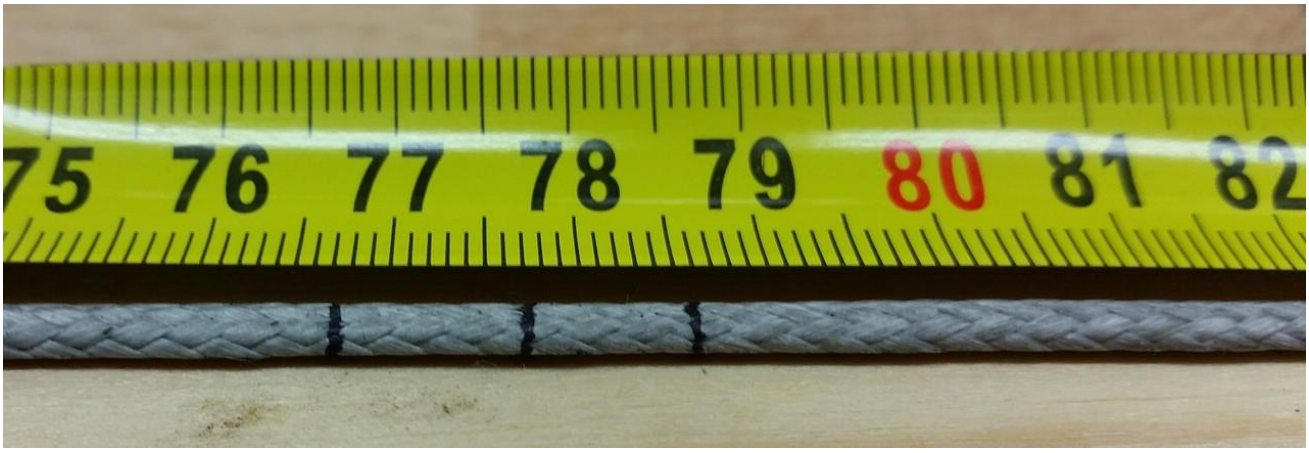
Nail the line to the slat on each end



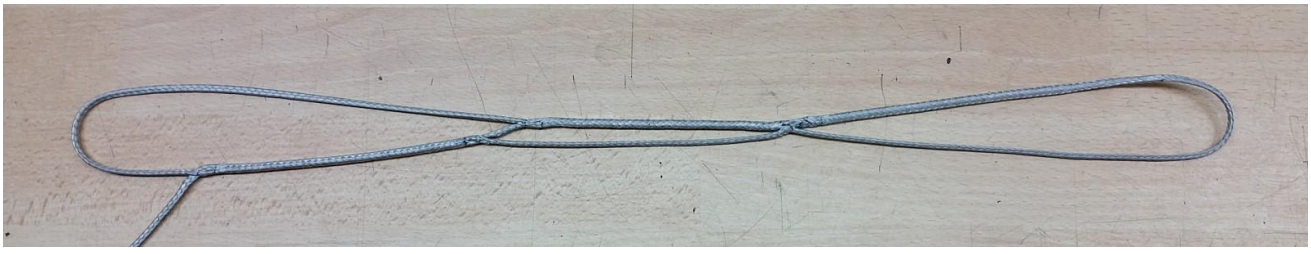


Use a felt pen with a thin tip to mark the line at the calculated positions. In case you want to make several equally DD Vari Loops Then you can mark the wooden slat as well and use it in future as stencil

Extend the marking so that it is going all around the line



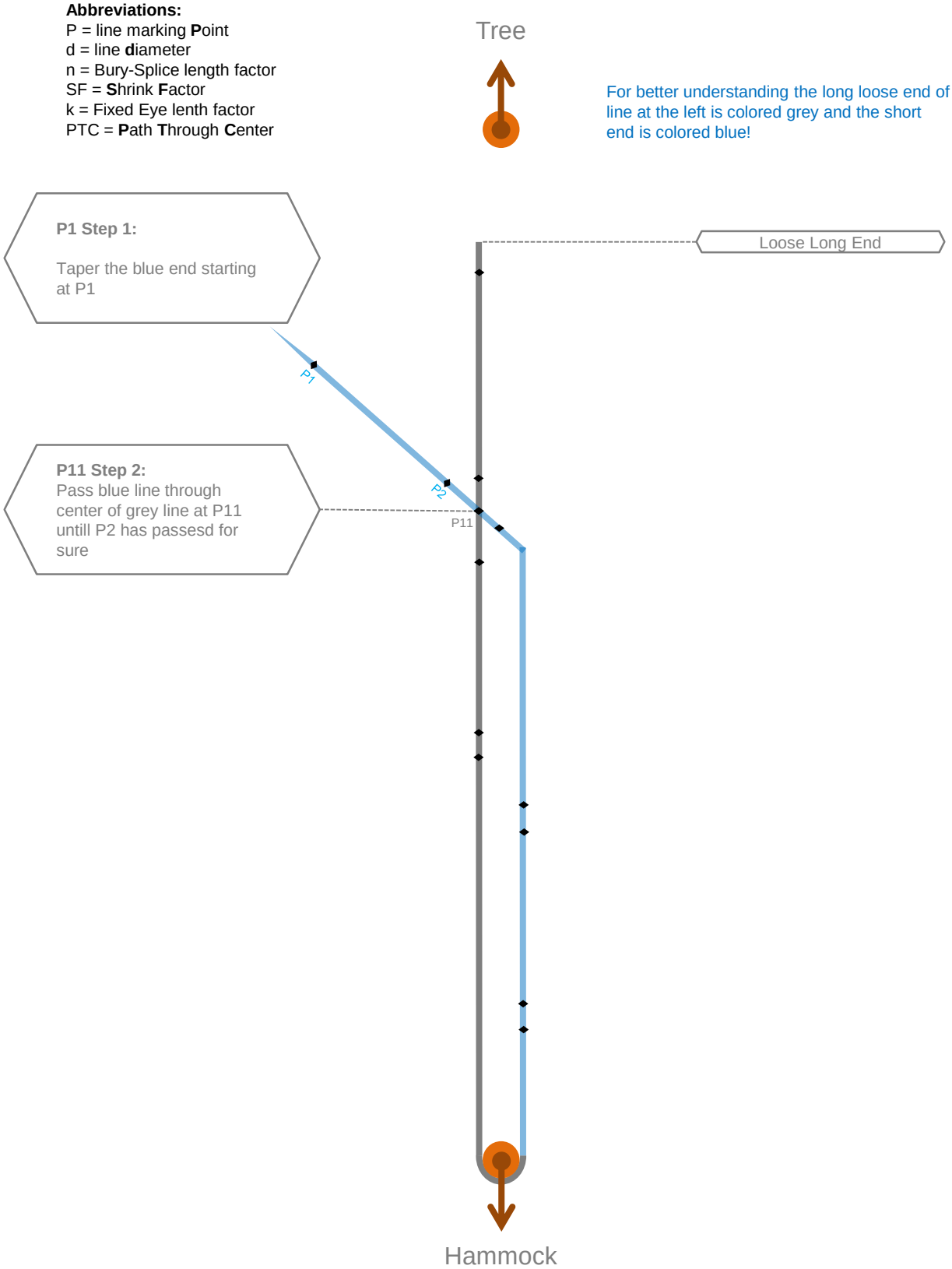
Remove the nails and splice the line according instructions on the next pages. Finally it should look like this:



d) Splice the line at marked positions (Step 1 and 2)

Brummel Lock for Fixed Eye

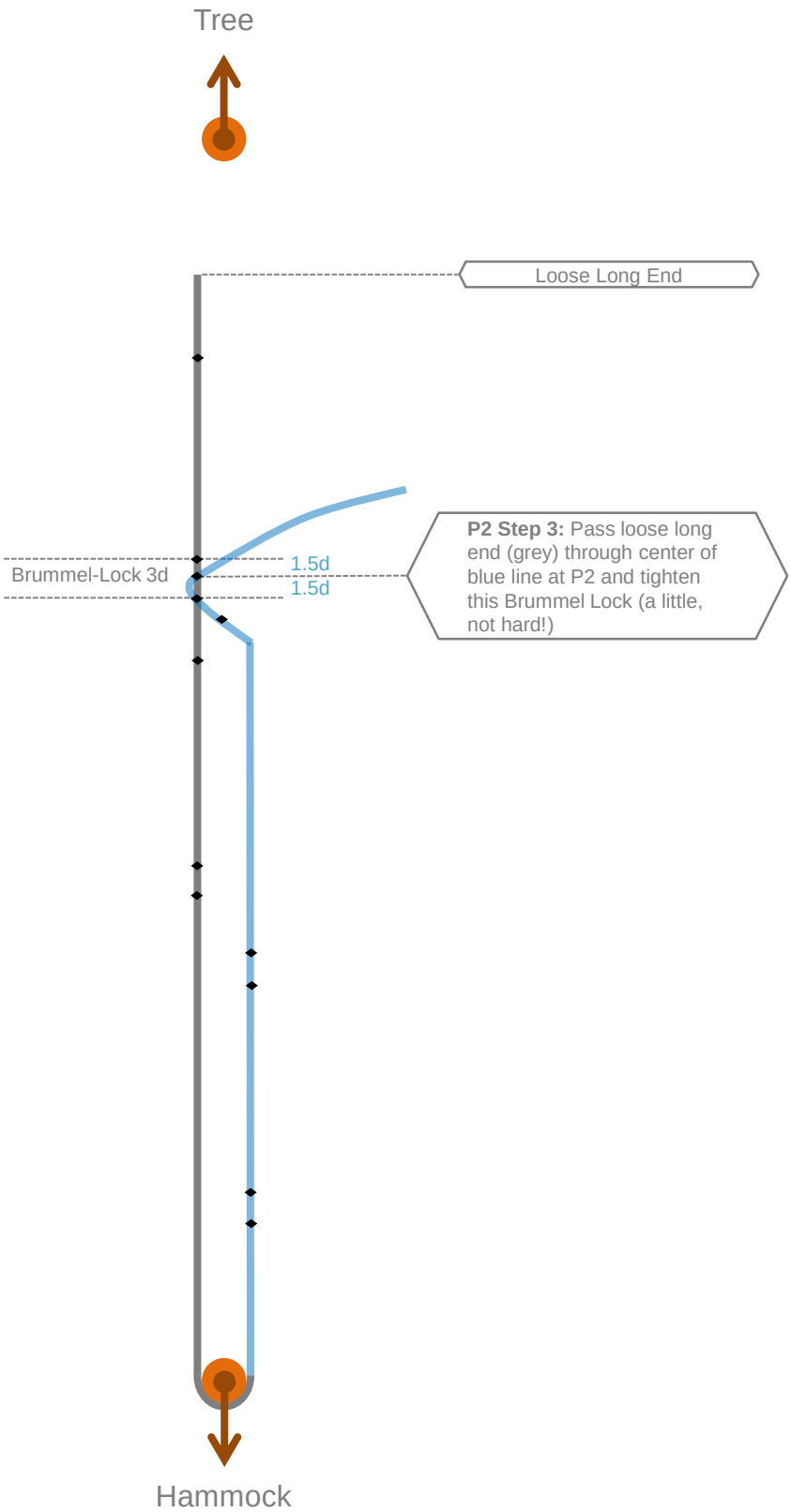
Abbreviations:
P = line marking **P**oint
d = line **d**iameter
n = Bury-Splice length factor
SF = **S**hrink **F**actor
k = Fixed Eye lenth factor
PTC = **P**ath **T**hrough **C**enter



d) Splice the line at marked positions (Step 3)

Brummel Lock for Fixed Eye

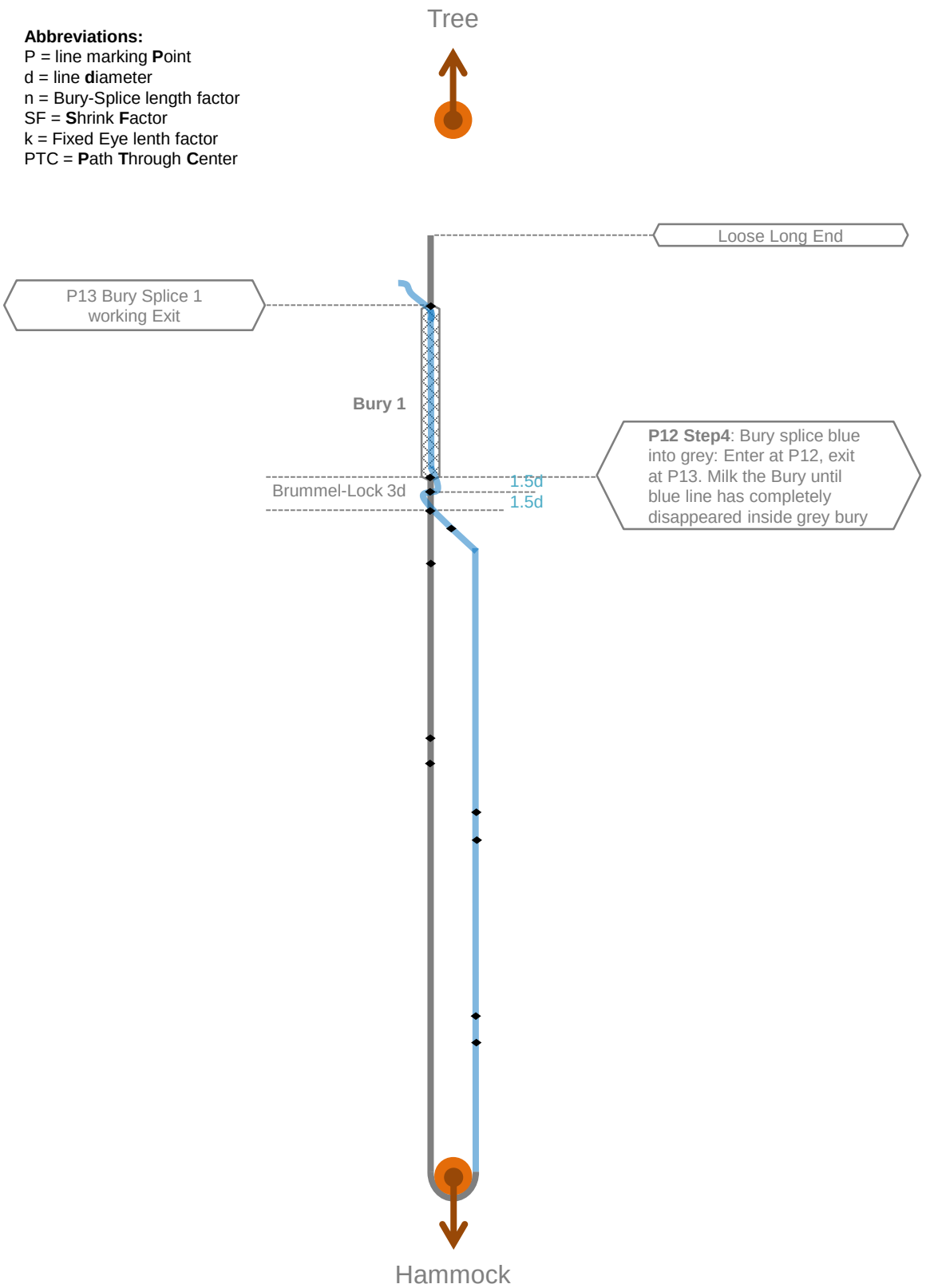
Abbreviations:
P = line marking **P**oint
d = line **d**iameter
n = Bury-Splice length factor
SF = **S**hrink **F**actor
k = Fixed Eye lenth factor
PTC = **P**ath **T**hrough **C**enter



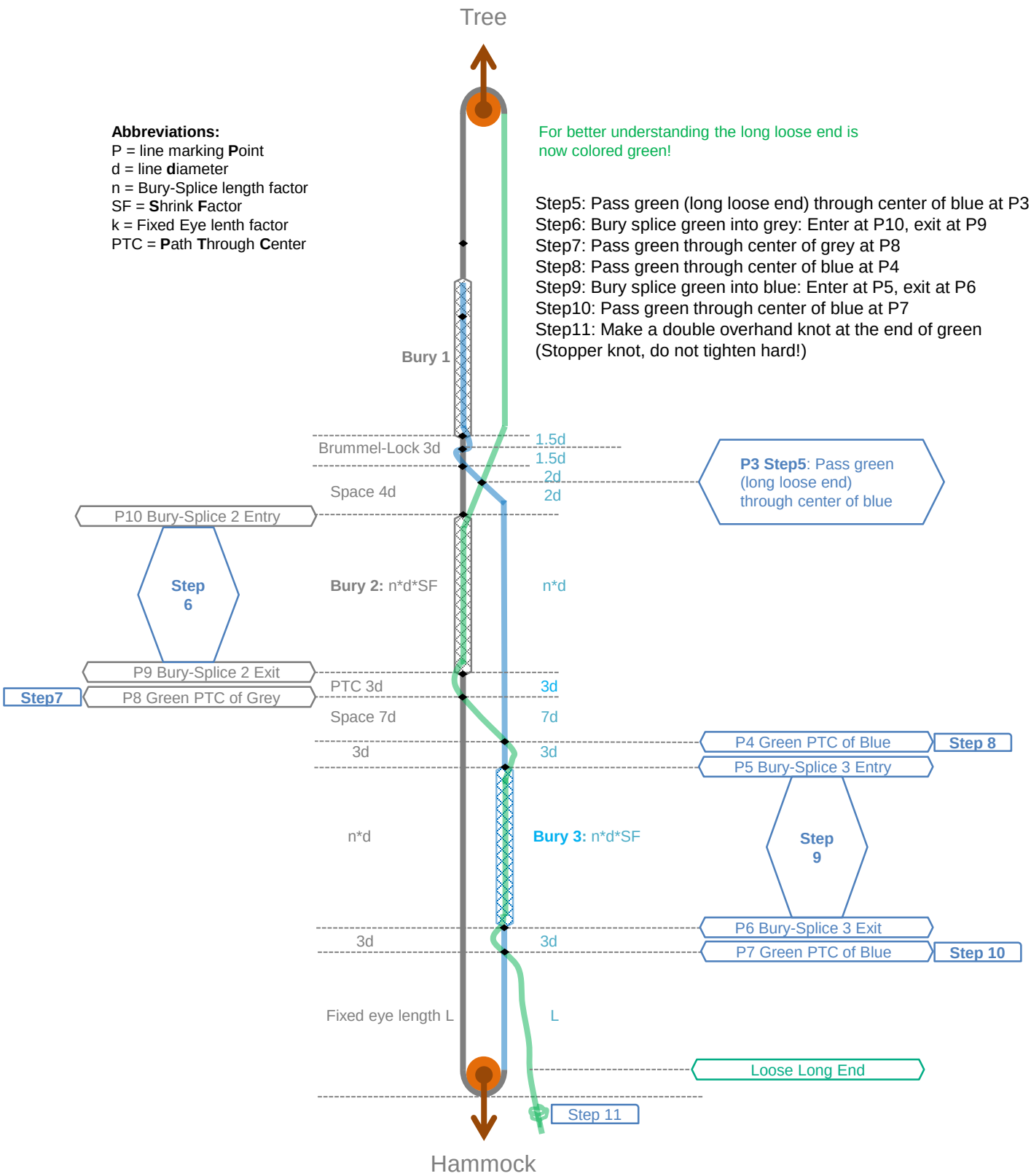
d) Splice the line at marked positions (Step 4)

Bury 1 for Fixed Eye

Abbreviations:
P = line marking **P**oint
d = line **d**iameter
n = Bury-Splice length factor
SF = **S**hrink **F**actor
k = Fixed Eye lenth factor
PTC = **P**ath **T**hrough **C**enter

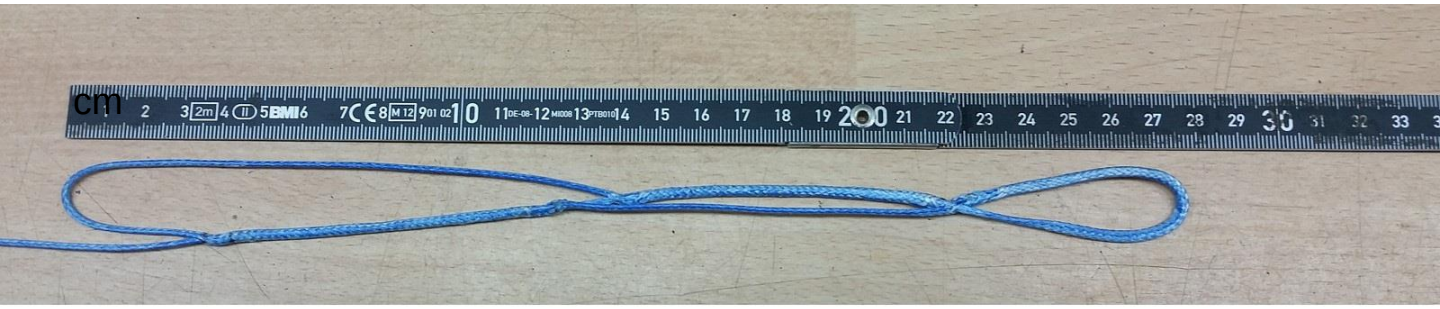


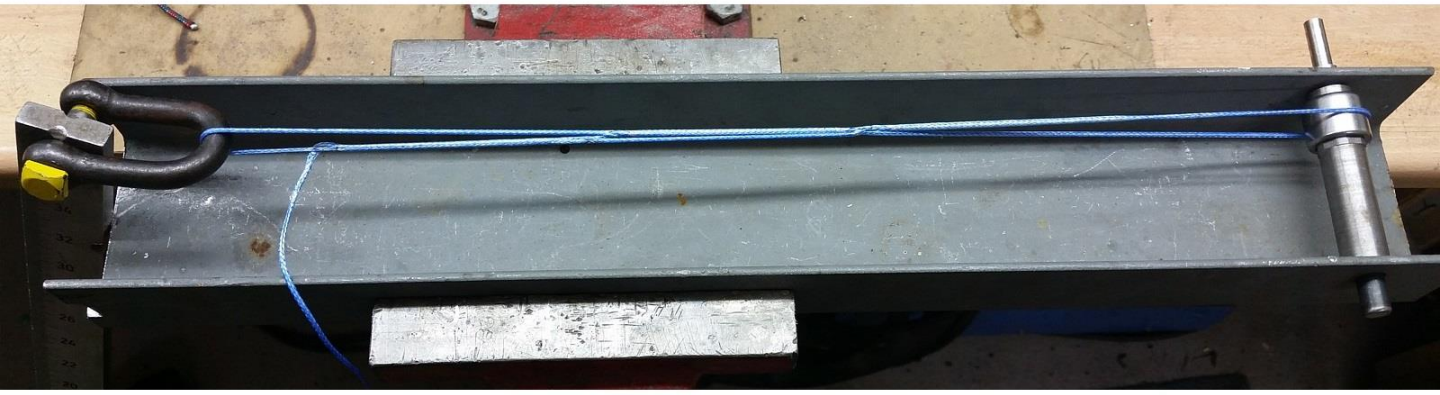
d) Splice the line at marked positions (Step 5 to Step11)
Bury 2 and 3 for Variable Eye

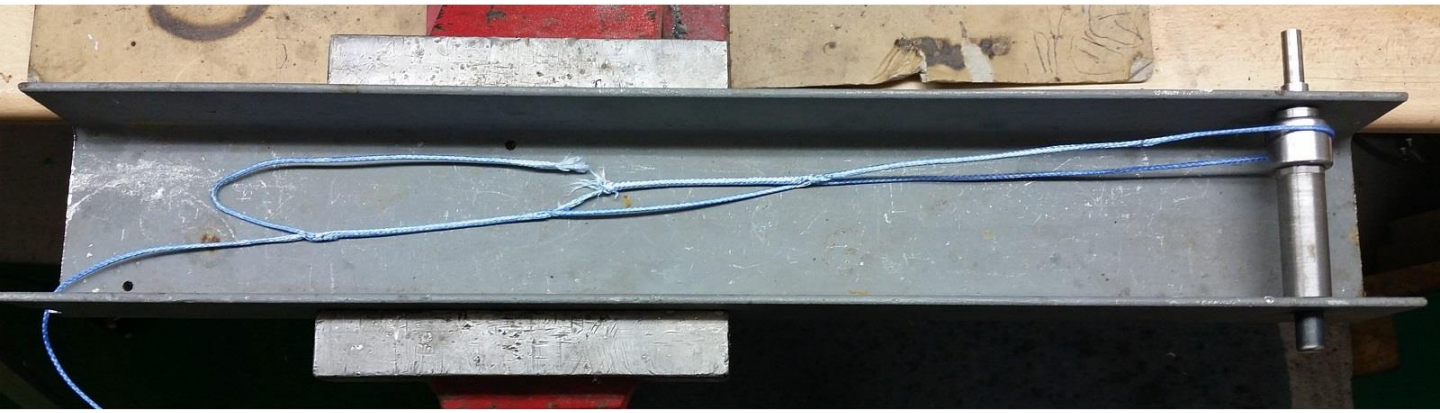


Test 1: Breaking Strength of a 2mm DD Vari Loop

Line: Liros D-Pro 2.0mm Dyneema 12 Strand
Rated Breaking Load (of a single line) 410 daN (with 2 Lines 820daN)
Each Bury Length is 40 line diameters (80 mm)





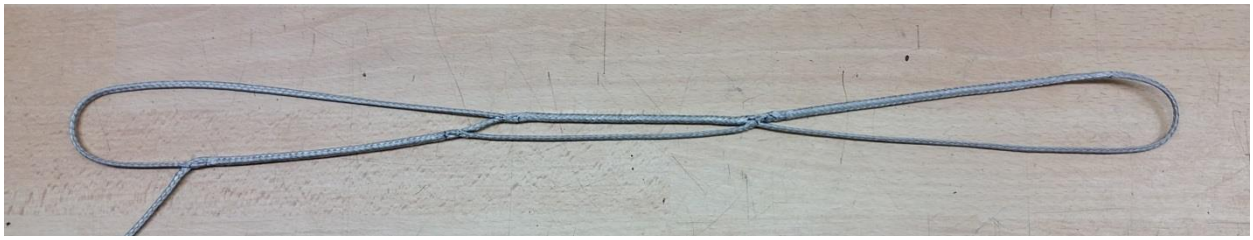


Test Result:
The DD-Vari Loop broke at 683daN, this is 83% of rated Breaking Load.

The test was done with just one DD-Vari Loop. A larger number of tests will surely show variations of figures.

Test 2: Breaking Strength of a 2.5mm DD Vari Loop

Line: Liros D-Pro 2.5mm Dyneema 12 Strand
Rated Breaking Load (of a single line) 580 daN (with 2 Lines 1160daN)
Each Bury Length is 40 line diameters (100 mm)



Test Result:
The DD-Vari Loop broke at **1041daN**, this is 90% of rated Breaking Load.

The test was done with just one DD-Vari Loop. A larger number of tests will surely show variations of figures.

Summary

The DD Vari Loop

- is a line loop that can be adjusted in length easily
- can carry double load because two lines share the load and carry the tension on equal level
- is a good opportunity to save weight and packing space
- provides more flexibility in suspension systems because it has a low minimum length
- can be handcrafted with average splicing skills