MPanel Shade Designer

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- Patterns now include tabulated panel dimensions for production....more
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- Export model for FEA now includes dimension units streamlining workflow....more

Version 16 summary of new features:

- Mapping of multiple panels allowing new partial panels....more
- New edge type "continuous cable" added by updating databases....more
- Selection of continuous cable sets the "same tension on all around" check box automatically....more
- Extra cable length for production added to databases and reports.
- Startup log window will close automatically after 1 minute.
- The program is now 64 bit for faster execution and larger image sizes.
- A 32 bit is available for old computers for 12 months providing time to upgrade old hardware.

Version 15 summary of new features:

- Reo patches now shown in Fabric view.
- Panels and Reo patches are now labeled.
- Panels and Reo patches can now be moved and rotated in fabric pattern view.
- This allows "hand nesting" of panels inside the roll lines.
- Reo patches now have a line indicating the force reaction direction.
- Dimensions and labels can be shown or hidden with a toolbar button.
- Panel exports include the Reo patch with reaction line.

Version 14 summary of new features:

- Center panel for 3, 5 and 6 sided sails available for evenly spaced or fabric width spaced panels (detail)
- Mapped total fabric length checks if end strips will fit into roll width and then counts longest length.
- New "Sail Join" edge style added as work-around to make multi-part sail patterns which can be joined to form sails with more than 6 sides (detail)
- Drop down arrows implemented on measurement tables
- Date entered now uses a date/time picker box and legacy files still read in OK.

Version 13 summary of new features:

- Corner details such as D-Rings accurately shown and drawn on patterns for plotting (detail)
- Corner Style adds truncated or rebated corners for plotter/cutter (detail)
- Match marks in seams (detail)
- Seam dip offset now shows deepest point along seam (when max dip is more the 5% from the center) -

detail
- Panel Mapping now shows total fabric length (detail)

Version 12.1 maintenance release (Feb 2021):

- Corrected a conversion error in customer added database values when working in cm (customers working in cm should double check their values after this change).
- Saved view orientation could fail if the locale used commas as a decimal point, now corrected.
- For new installations, a change in the default file locations allow more reliable installations on computers shared between different users.

(an update to an existing installation will not change any file locations or lose any data.
(for computer experts, in depth technical information on this change is available here:)

Version 12 summary of new features:

- New Seams database allows user defined seam details and guides.
- New Hem "Fold-to Guide" added to edges database.
- Export Panel Mapping to standard plotter file.
- New report generator allows for user report selection.
- Updates to help file include "height ratio explained" and corner rings.

Short Video: What's new review

Introduction

MPanel Shade Designer is a program that assists in the design and patterning of shade sails that are built with stretchy materials such as shade cloth.

A set of site measurements between support poles or points is entered by the user following the sail layout images provided, and the correct three-dimensional shaped sail to fit between these support points is created, using MPanel Software robust form-finding engine.

An important detail is to adjust the designed sail shape to allow for the corner hardware widths... in effect the sail has to be designed over sized, so that it will fit when the corners are truncated to match the hardware width.

The shaped sail is then flattened, or paneled, using the MPanel Software patterning engine, to produce a fabric pattern that correctly fits the measured space.

The fabric pattern is dimensioned and added to production reports, which contains all the information needed to produce the shade sail. These reports can be printed, or made into PDF's.

Software Updates:

Each year a new version of the software is released typically containing new features as well as any changes necessary to maintain compatibility with new versions of Windows operating system. Users with a current software support subscription can download these updates from their Dashboard on mpanel.com

MPCalc:

A companion product, MPSD Web App, lets you enter site measurements directly into a tablet / smart phone / notebook, check the dimensions before leaving the site, and email a model file back to the office to open in MPSD. The web app is fully described in the document "Using the MPSD Web App". Access to the website is available to all users with a current support subscription (included for the first year from purchase).

The web app is located at:
www.mpcalc.com
and a description of using the measured data in MPSD is on the Imports page.

Short Video: MPCalc Web App

General operation of the program

The program is supplied with several default databases for fabric and hardware and example corner constructions.
Custom Fabric
Custom Hardware
Example Corners

These databases contain a few example entries, so that the user is able to operate the program on first use. However, users need to populate the databases with additional details of the fabrics and hardware that they use. This is done through the "Edit Databases" menu item, and guidance on adding items is provided below:

Fabric databases
Hardware database (edges)
Hardware database (corners)
Hardware database (links)
Example corner image database
Example seam database

Additionally databases from a fabric suppliers may be downloaded, as described here. These can be used in conjunction with the custom databases.

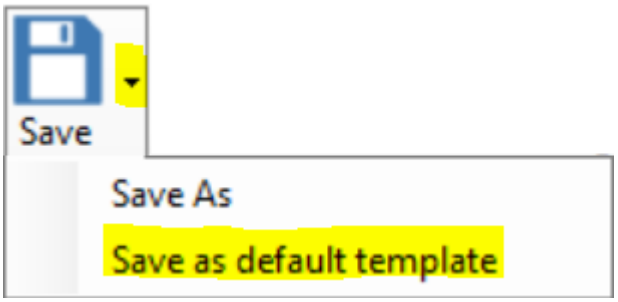
Once the databases are set up, a user enters a new job into MPanel Shade Designer by:

- Filling in the Start page with job details like project name, client, date required, etc.
- On the Materials page choose a fabric and color, and then specify the edge type and hardware.
- On the Measurements page supply site measurements (lengths, widths & heights) and any corner links and/or connection hardware, etc.
- On the Calculations page click the "Calculate" button to begin the process. The design will be sent to the MPanel engine for form finding, checking, and patterning.
- Seams can be added and adjusted on the Seams Page
- The fabric pattern can be inspected on the Fabric Pattern page

- The shade design can be inspected on the Visualization page.
- Production reports can be generated. They can be printed or made into a PDF's. Production reports
- A visualisation report can be generated . It can be printed or made into a PDF's. Visualisation Report

The job can optionally be saved using the menu item File... Save
The saved file name is shown in the bottom status bar, which also shows the status of the calculation. After any data changes the file should be re calculated, and saved again, to keep a correct record of the job.

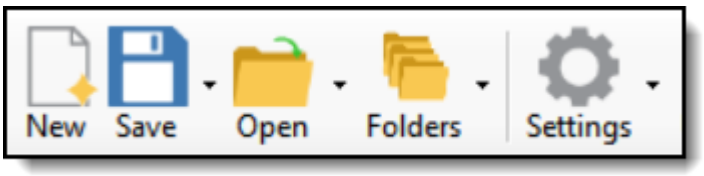
The job can also be saved as a "Default Template". Then the settings for that job will be used when the program is started again.



Both the 3D model and the flat panels can be exported in dxf format.
The 3D model could be used in other software packages to help create visualisations.
The flat panels are in a format that can be read by an automated cutting machine.

Start Page

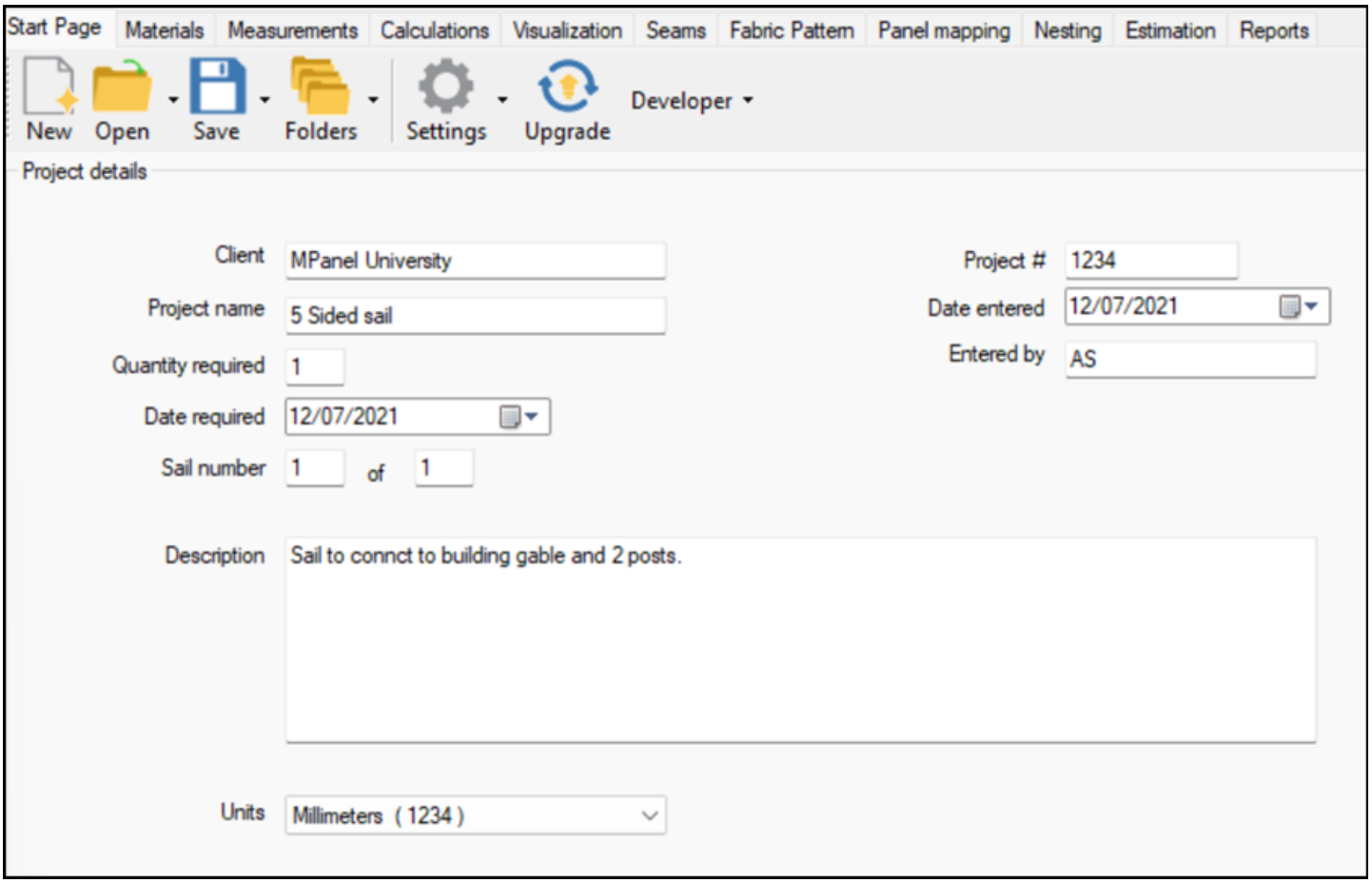
On the start page the user enters project details that will help us manage the job.



In the toolbar you can click on buttons for:

- `New` `start a new project`
- `Save` `save the existing project`
- `Open` `open a project that had been saved previously`
- `Folders` `opens the folders where MPSD models are saved, and also the exports folder`
- `Settings` `sets overall parameters for running the program.`

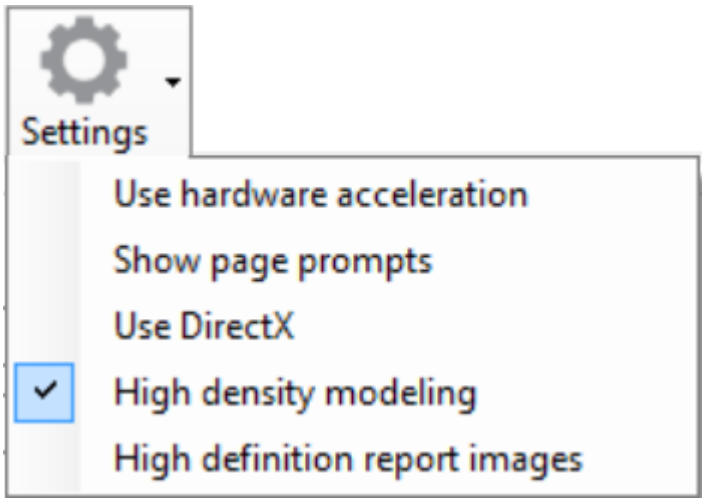
You can enter project details as follows:



- Client the name of the end client
- Project number a reference number to identify the project
- Project name the name of the project
- Quantity required the number of copies of this shade sail that are needed
- Date required the due date for delivery
- Sail number if a project has several different shade sails, this typically would be sail number 2 of 4
- Date entered automatically filled in, the date this entry is made
- Entered by name or initials of the person making entering this project
- Description a short description of the project
- Units select the unit system to work in. (It is a best practice to select a single unit system, and use that for all of your jobs)

All of the entries are optional, except for the date entered and the Units.

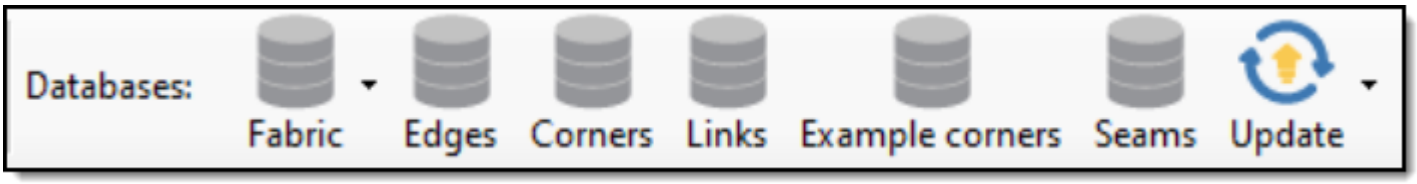
Settings



- Show prompt Toggles the display of a prompts screen that can help beginner users
- Use hardware acceleration Only turn this off if your video card will not display the images correctly
- Use DirectX Only turn this on if your video card will not display the images correctly
- High density modeling To provide smoother sail edges for export plotter/cutter files this option uses a higher mesh density which can slow performance
- High definition images Turn this off if your video card will not display the report images correctly (black zones)

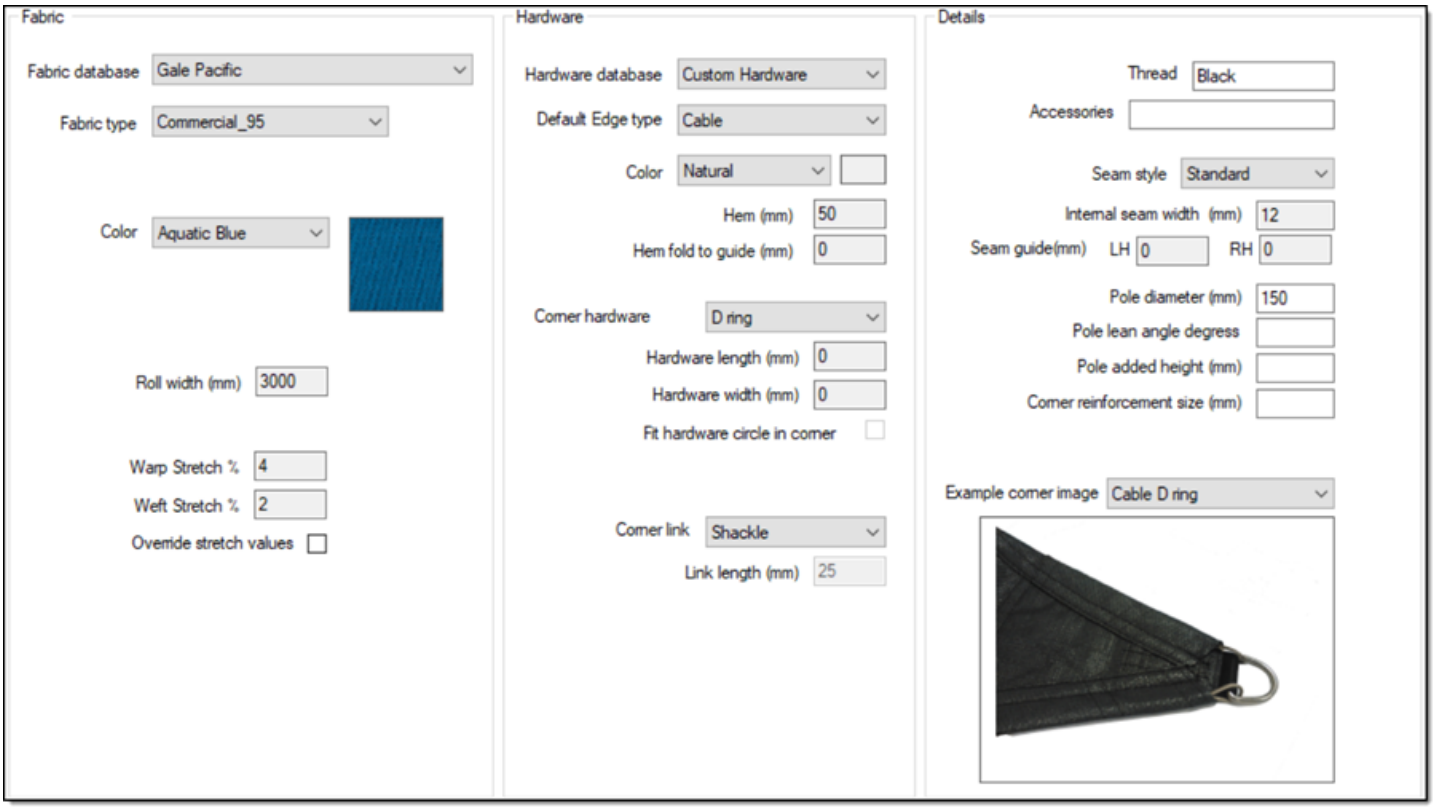
Materials

On this page the user specifies the type and color of fabric, the default edge type, and the default corner hardware.



In the toolbar you can click on buttons for:

- Databases open databases to edit or add to the contents
- Check for updates checks on line with our server for any database updates, and downloads them



Values will then be shown from the databases for fabric stretch, roll width, hardware length, etc. These values are read only.

The fabric settings will be used as shown. A colored fabric swatch is shown to assist with fabric selection.

Default values are shown for the fabric stretch based on feedback from fabric suppliers or other fabricators, however, you can and should use your own compensation values based on your experience which may be different to other suppliers and on some projects such as very small or very large sails, it may be necessary to override the supplied values. We can provide advice on how to complete your own fabric stretch tests by contacting support@mpanel.com.

The hardware settings are used as the default fabric edges, corner hardware, and corner link types for the shade sail. It is possible to change individual edges and corners on the measurements page.

A typical corner construction is shown for guidance. This is determined by the edge and corner hardware type chosen. The example image can be replaced by any photo of your specific corner construction, as described here. Or if you prefer to not have an example image you can select "None" in the image drop down.

Settings in the Detail box include thread type, accessories, and the internal seam width. The internal seam width is used when the sail is made from several panels, joined together. The internal seam width is added to both panels.

Corner Reinforcement

MPSD will create simple corner reinforcement patch drawings, and a corner reinforcement report, based on the reinforcement edge length specified in the details. If you don't want a reinforcement patch drawing specify a reinforcement size of zero (0)

Pole Visualization

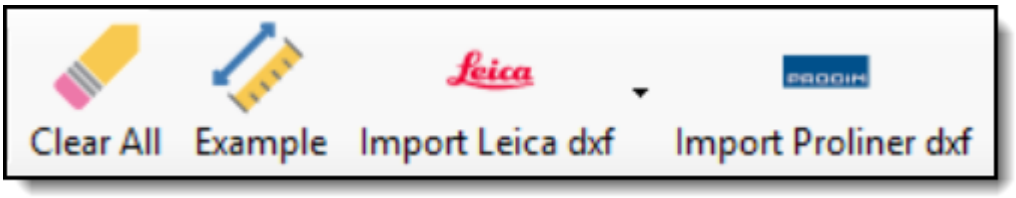
For visualization purposes a pole diameter can be specified. This is not used in the program calculations, but a pole is added to the visualisations. To prevent a pole being added to the visualisations specify a pole diameter of zero (0).

In addition the pole visualization can be specified as having "extra height", that will extend up beyond the attachment point.

In addition the pole visualization can be leaned outward by a specified number of degrees. This is sometimes used to make a more visually appealing pole/shade sail structure.

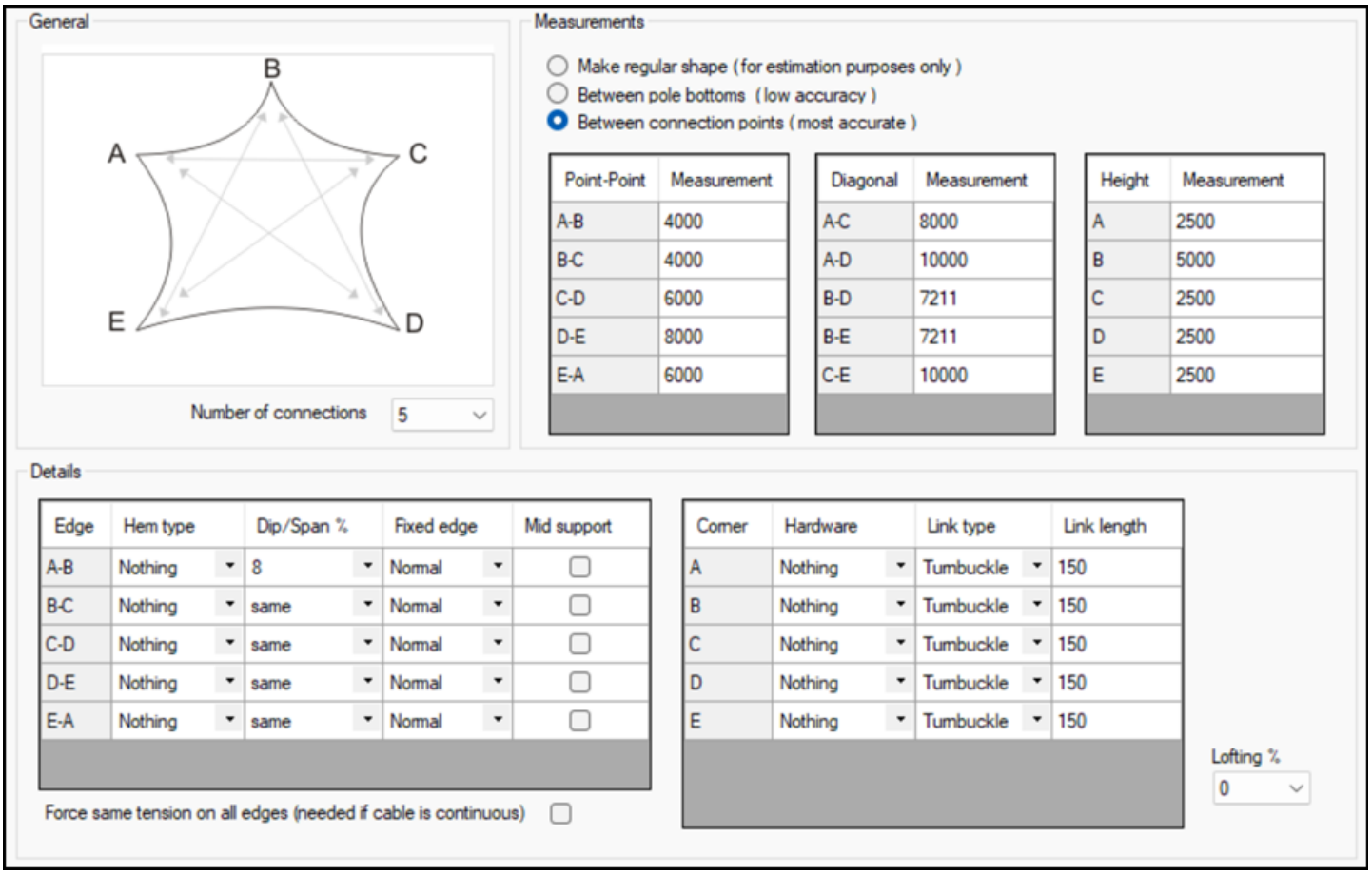
Measurements

On this page the user enters the site measurements, and defines edge and corner details.



In the toolbar you can click on buttons to:

- `Clear all` `clears all the entered measurements`
- `Example measurements` `loads a set of example measurements`
- Import `Leica dxf` `reads dxf file containing pole top measurements, captured using a Leica 3D laser in several formats`
- Import `Proliner dxf` `reads dxf file containing pole top measurements, captured using a Proliner digitiser`



- **Number of connections.**

Sets this page up for 3, 4, 5 or 6 connection points.

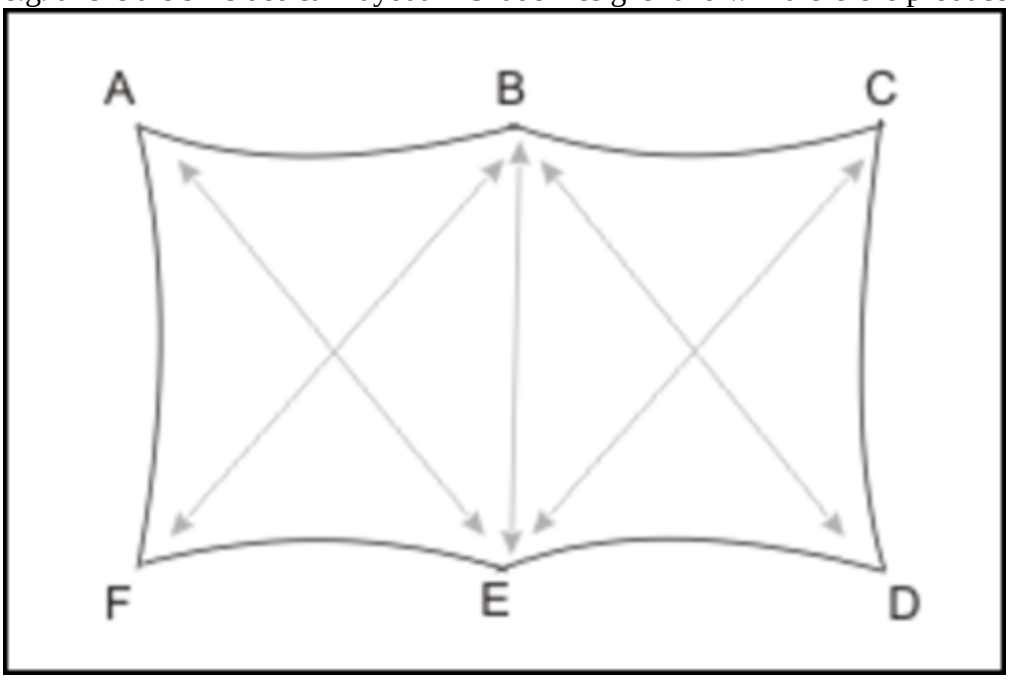
- **Measurements**

Orientation and shape considerations.

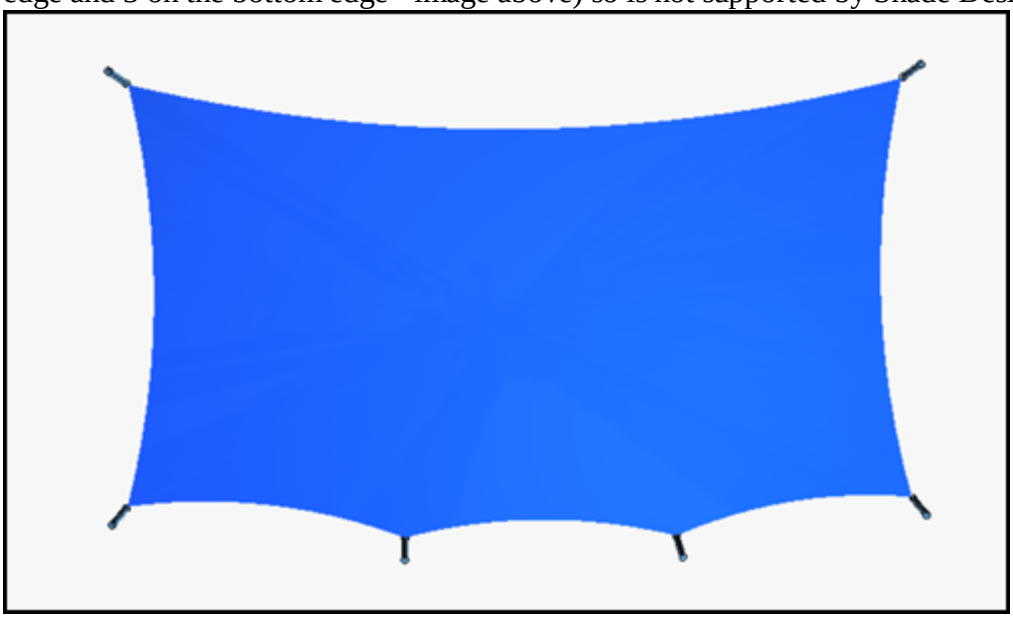
Shade Designer is intended to model and pattern typical basic shade sail shapes which represents the bulk of sails most shops fabricate. More complicated shapes and sails with more connections or connection patterns which are different to the images shown in Shade Designer, need to patterned using MPanel-Pro or the in-house methods the fabricator used to make sails before adopting Shade Designer. Shade Designer will produce reliable results when site information is entered following the sail layout images provided in the program. Entering site measurement data differently may fail to calculate and/or produce poor patterns.

It is also important when considering orientation to take into account the paneling procedures in Shade Designer. Best practices are to add seams along the direction of maximum shape change. Shade Designer applies the 1st seam from point B to midway between D and E for 5 sided sails. Therefore, if the sail has a high connection it should be entered as point B to align the seam in the direction of maximum shape change. Similarly, Shade Designer will add the first seam between points B and E.

e.g. this is the six sided sail layout in Shade Designer and will therefore produce reliable patterns



This is also a 6 sided sail but does not conform to the Shade Designer 6 sided sail shape (3 connections on top edge and 3 on the bottom edge - image above) so is not supported by Shade Designer.



Between connection points

It is always best to make site measurements between the actual connection points (i.e.- at the pole tops) as this

minimizes errors due to pole lean and connection details.

The measurements are taken between the inside edges of the fixing points, perhaps with a tape measure with a hook on the end. It is essential, that the tape measure form a straight line between the connection points and that it is pulled tight.

(Do not bend the tape around obstacles such as walls or trees as this will produce inaccurate measurements. If obstacles prevent straight-line measurements to be taken you will need to take additional measurements sufficient to allow calculation of the correct dimensions. Refer to separate note "how to measure around obstacles")

Between pole bottoms

A less accurate option is to enter measurements taken at ground level. In this case the fixing point should be allowed for at ground level, perhaps by drawing it with chalk on the ground. A check should also be made to see if the posts are vertical. If a "pole lean angle degrees" is added on the materials tab then poles will be angled based on the specified angle. This will result in the sail pattern being larger than the ground dimensions.

Regular shapes

For initial designs and estimations you can create regular shaped sails. These will produce realistic visualisations and material estimations. But since the measurements are not the real on site dimensions between the poles, they should not be used to make production panels.

The measurements can be cleared, which will be the usual start of a measuring session.

Once a set of measurements has been entered you may want to save them into a named file for future use. You can do this with the "File Save as" menu item

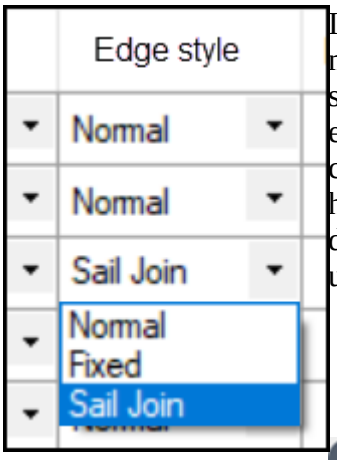
Example measurements
For ease of practicing with the program a set of example measurements can be loaded in that will work to produce a reasonable sail design, for 3, 4, 5 and 6 poles.

- **Edges**

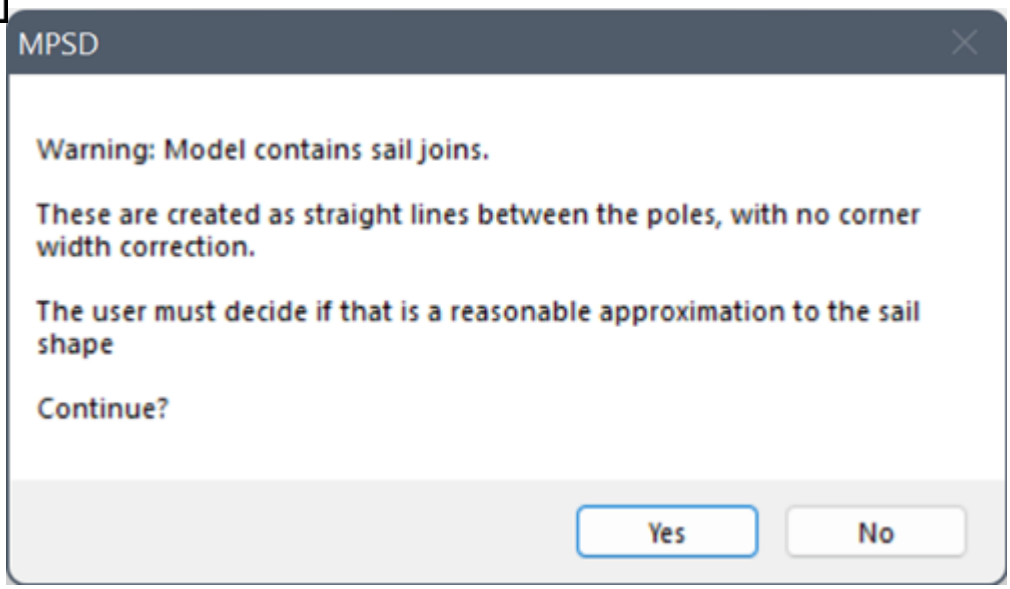
```
Hem type          set the hem width for this edge
Dip/Span ratio    this will set the tightness of the cable or webbing edge for this
edge.
Edge style        specifies if the edge is normal, or restrained to a fixed edge, like a
keder edge against a
                  building or will be a joined edge to another sail (see "Sail Join"
below)
Mid point         adds a support at the midpoint
```

Note: if the sail has a continuous cable running though the corner connections, like an pulley or ezglide, tick the "Force same tension on all edges" .
This will alter the dip/span ratios on each side, to maintain the same tension in each cable edge, with the average dip/span being as specified.
Typically this means that longer edges will have a larger dip/span, and shorter edges a small dip/span, than the specified dip/span value.

Sail Join



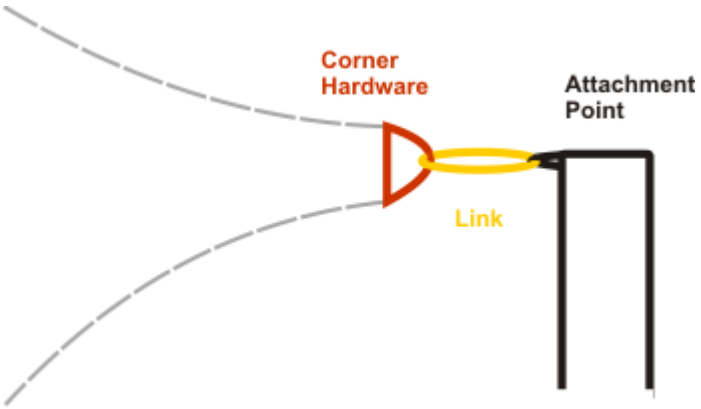
Is a new tool added in Version 14 of MPSD to produce simulated patterns for sails of more than 6 sides. To produce these "pseudo patterns" we create models for 2 or more sails and specify one or more edges to "sail join" edge style. This will create an straight edge between the poles including straighten the corner links and no corner width corrections are made. A warning is issued when calculating sails with a sail join edge to highlight that the sail shape is an approximation only and it is the users responsibility to decide if the shape is correct. Users should review the below video to clearly understand the limitations of this tool.



Video: Sail Join - edge style

- **Corners**

```
Corner hardware    specify the corner hardware to be used
Link type          specify the type of link to be used
Link length        this value is normally read from the link database.
                   But for guys you can specify the length in the table.
```



- **Lofting**

Lofting can be applied to counter the effects of the sail sagging over time. Lofting is achieved by shaping the panels so that more tension is applied between the high points. The lofting tension is scaled so that a setting of 20% will raise the center of a square hypar 20% towards the high diagonal.

```
Lofting does not apply to 3 sided sails.
On 4 sided sails lofting is applied toward the high diagonal, whichever it is.
On 5 sided sails we assume that corner B is high, and apply lofting towards BD and BE
diagonals.
On 6 sided sails we assume that either A, C, E are high, or B, D, F are high, and apply
lofting accordingly.
```

Calculate model

On this page the design is sent to the MPanel form-finding engine, to go through these stages:

- **Checking for site measurement errors.**

Triangular shades cannot be checked for site measurement errors, but 4, 5 and 6 pole shades can.
A warning is generated when the site measurement error exceeds 0.5%, and a failure is generated when it exceeds 3%.
With 5 and 6 sided sails some hints are given as to which measurements are incorrect.

In Version 17, the geometry and modeling solver has been significantly enhanced to better handle site-measurement inaccuracies- particularly in cases where three poles or connection points are aligned (as often occurs with five- or six-sided sails). In such configurations, conventional modeling logic can be extremely sensitive to even small measurement discrepancies. In earlier releases, these minor errors could cause the site-measurement checker to fail. The updated solver is now more tolerant of small site-measurement variations and provides the same clear and consistent error reporting normally produced when poles are not in line.

- **Finding the correct three-dimensional (3D) shape for the shade sail.**

The correct shape for a shade sail is an anti clastic (saddle shape) sail, and this shape will help resist external loads. The shape is generated by computer modeling the sail as a mesh, and then adjusting the mesh shape until each node is in force balance. In addition the model design has to be deliberately over sized, so that it will fit correctly when the corners are truncated to fit the corner hardware width.

- **Checking the model outline shape.**

Basic checks are made on the model outline shape, and warning are issued if they exceed limits. A description of the shape limits is on this page.

Height Ratio Explained

- **Creating the visualisations .**

The shade sail is displayed as a rotatable 3D visualization, which allows for checking of the design and showing to prospective customers.

- **Creating the seam drawing.**

A copy of the shade sail is displayed with initial seam positions shown. The seam positions can be altered by choosing different paneling options, or by moving the seams by hand.

The design progress text is color coded as follows:

```
Green       the design is progressing satisfactorily

Orange      warnings or design suggestions but the engine will continue

Red         for problems that stop the engine and the design
```

Warning explanations

MPSD issues warnings during the design to help you design a better shade sail. Here are short explanations of the most common warning messages, with hints on how to improve the design to avoid the warnings.

- **Site calculations failed**

The measurements are wrong, and cannot be used to make any shape. An example of this would be a triangle with a long side, and two short sides that didn't add up to at least the length of the short side.

To fix this check the site measurements, making sure that they are entered in the correct units. Especially check that measurements in feet haven't been entered in inches. And check that the measurements have been entered in the right order.

- **Site measurement error**

There is usually a small error when making measurements between points. MPSD measures the error for 4, 5, and 6 pole shades. As long as this error is below 0.5% then the normal installation adjustments should take care of it.

With larger errors it is best to re check the site measurements. Measurements are more difficult when the ground isn't flat, and the accuracy can be reduced by tape droop, misreading, etc. Above 3% error MPSD abandons the calculation.

- **Cable dip/span above 10%**

Usually the cable dip/span ratio will be below 10%. In some circumstances higher values can be used. Note that with triangular sails large dip/span ration can cause small or zero corner angles, which will give problems with stability, paneling and seams.

- **Some links are zero length**

There is nearly always some corner link length, even if it just a snap link. So if MPSD sees a zero length link, there is probably a mistake.

Check the corner hardware table and the corner hardware specifications.

- **Relaxed model: residual warning**

MPSD finds the correct shape for the shade sail in a series of small steps, and stops when the change in step size (the residual) is small enough. Normally the residual will be less than 0.001, when it is higher than this it means that MPSD has had difficulty with the model.

Some of the other warnings will usually give you a clue on what to change.

- **Corner offset values are large**

When the corner hardware has a width, like a D ring, the shade sail has to be deliberately designed too large, to corner points past the poles, so that when the sail corner is cut off to fit the D ring the sail will fit correctly between the posts. The amount that the corners have to be moved is called the truncation offset, it is normally a small amount. With sails that have skinny corners the offset will get larger, and a warning is given when the offset exceeds 10% of the average edge length. This warning usually means that your design is too skinny in a corner. This is particularly a problem with triangular sails.

To fix this you can:
a) alter the geometry of the poles so that they are more regular, so a triangular sail should be closer to an equilateral triangle.

b) tighten the edge cables, by using a lower dip/span ratio, which will increase the angle in the corners. (although this may give problems with tensioning the sail on installation, and gives higher forces on the poles)

c) reduce the corner hardware width. So selecting a loop, which has a zero width, will make this problem go away. (But you have to really use a loop in the sail construction)

- **Shape checks:**

MPSD checks the shade sail against a set of simple rules that help with good shade sail design. When the design falls outside these rules than a warning is issued. The shape rules are described here.

- **Smallest corner angle:**

If the sail corner angle is small then there will be problems as the narrow sail degenerates into a rope, which can twist on installation, which provides no shade in the corner, and will give a problems later with the seam allowance. Seams below 10 degrees angle are a problem, below 5 degrees angles can seldom be made. This is particularly a problem with s sails.

To fix this you can:

a) alter the geometry of the poles so that they are more regular, so a triangular sail should be closer to an equilateral triangle.

b) tighten the edge cables, by using a lower dip/span ratio, which will increase the angle in the corners. (although this may give problems with tensioning the sail on installation, and gives higher forces on the poles)

c) reduce the corner hardware width. So selecting a loop, which has a zero width, will make this problem go away. (But you have to really use a loop in the sail construction)

- **Largest corner angle:**

If the corner angle is too large then the corner link will have low tension. This is usually only a problem with 5 or 6 point sails.

- **Max Shear strain**

When the curved 3d shape of the sail is flattened into a panel, some fabric distortion must occur. Due to the flattening method the distortion occurs on the bias, as shear strain. The amount of shear strain that the fabric can accept before it wrinkles depends on the fabric. Knitted HDPE shade cloth is OK up to 10% , although it is better for the cloth to be below 5%. Stiffer fabrics, such as PVC coated polyester, can only take 1% shear strain.

To fix a high shear strain, make the sail in more panels. Then the seam shape will help with the 3D curved shape, and the fabric distortion will be lower.

- **Max Shear strain check panel**

The check panel is calculated so that dimension checks can be made on the finished sail before installation. If the shear strain is too high then these checks will be unreliable. Values up to 20% are acceptable, but below 10% is better.

- **Seams are extending corners a lot**

When adding a seam allowance the corner extends outward. Then when the seam is folded back and sewn the comer comes back to the original position. With a skinny corner this extension can be excessive, and result in poor corner accuracy and excessively large panels,

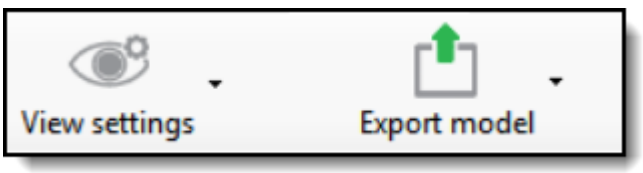
To fix this increase the corner angle, using the methods mentioned above.

- **Panel width is more than roll width**

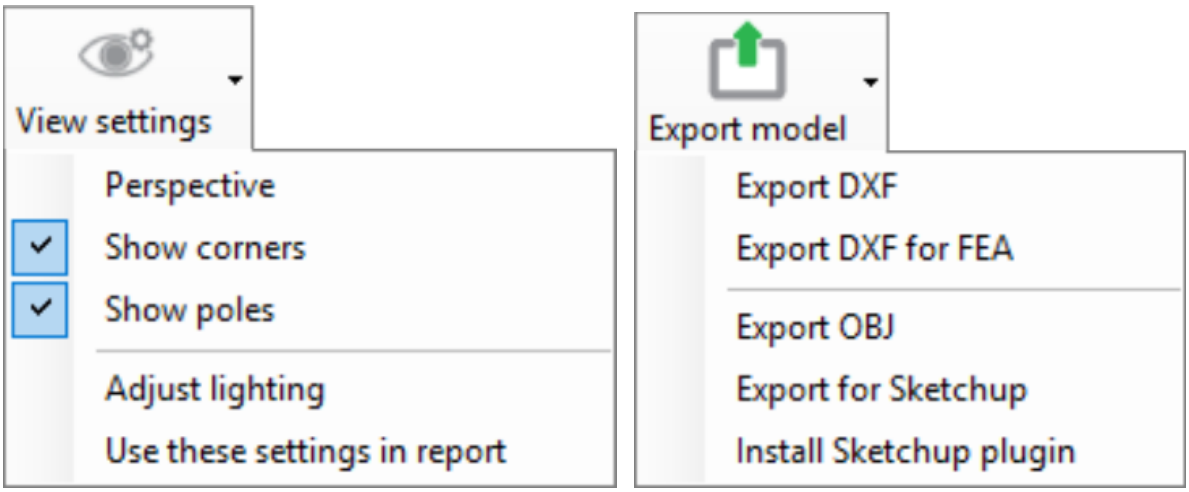
If any panel is wider than the specified roll width, this warning is given. In may be possible to join two pieces of fabric to increase the effective roll width, in which case this warning can be ignored.

Visualization

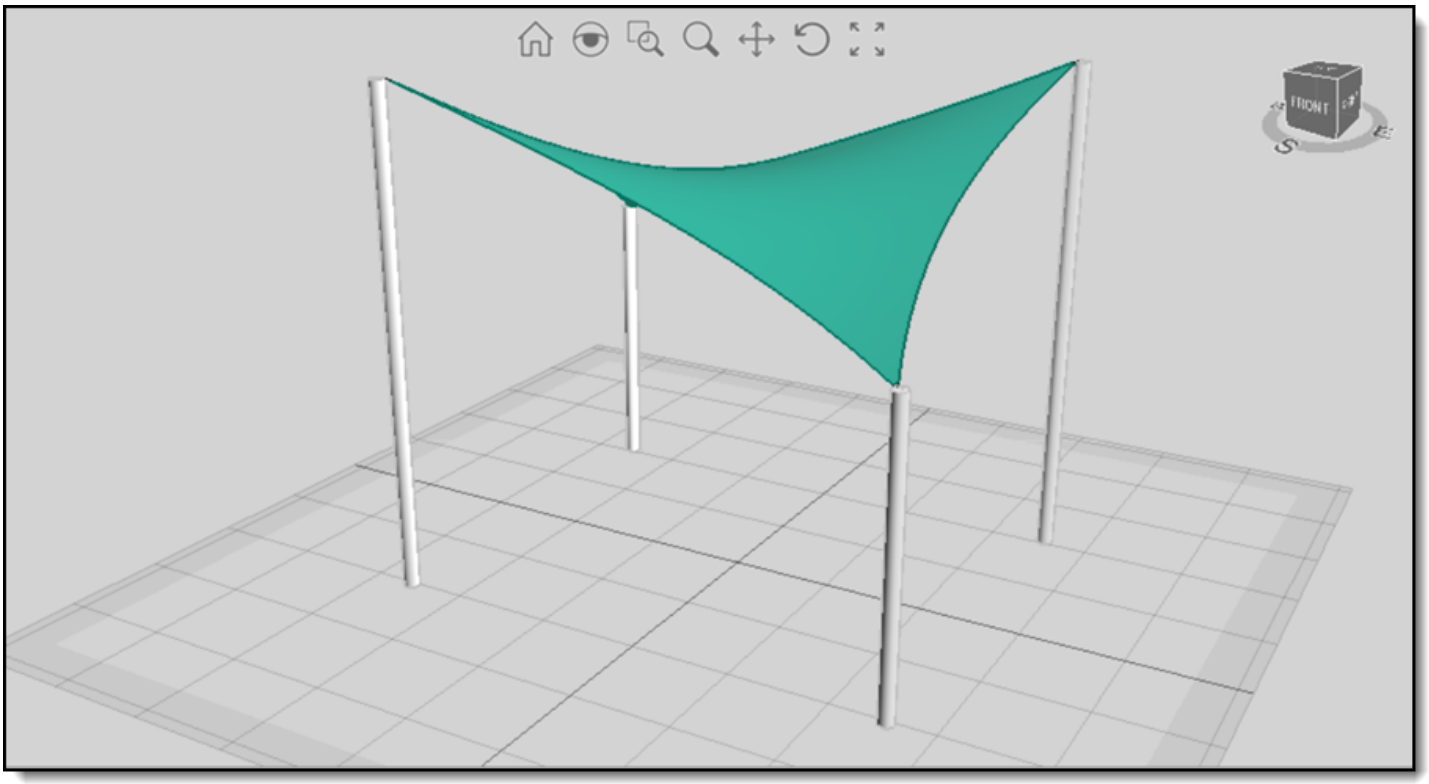
On this page a 3D image of the shade sail model is shown, in a representative match of the selected fabric color along with any connection links.



In the toolbar you can click on buttons to:



- View settings Change the way that the model is shown on the screen
  Change lighting settings
  Use settings in reports
- Export model Exports the model for use in third party software - formats include DXF, OBJ, SKP (for Sketchup including a plugin installer)
  Export DXF configured to be read into MPanel FEA for analysis (such as ponding, stresses, reactions etc).



The model can be viewed from preset Top, Front, Right, or Isometric views.

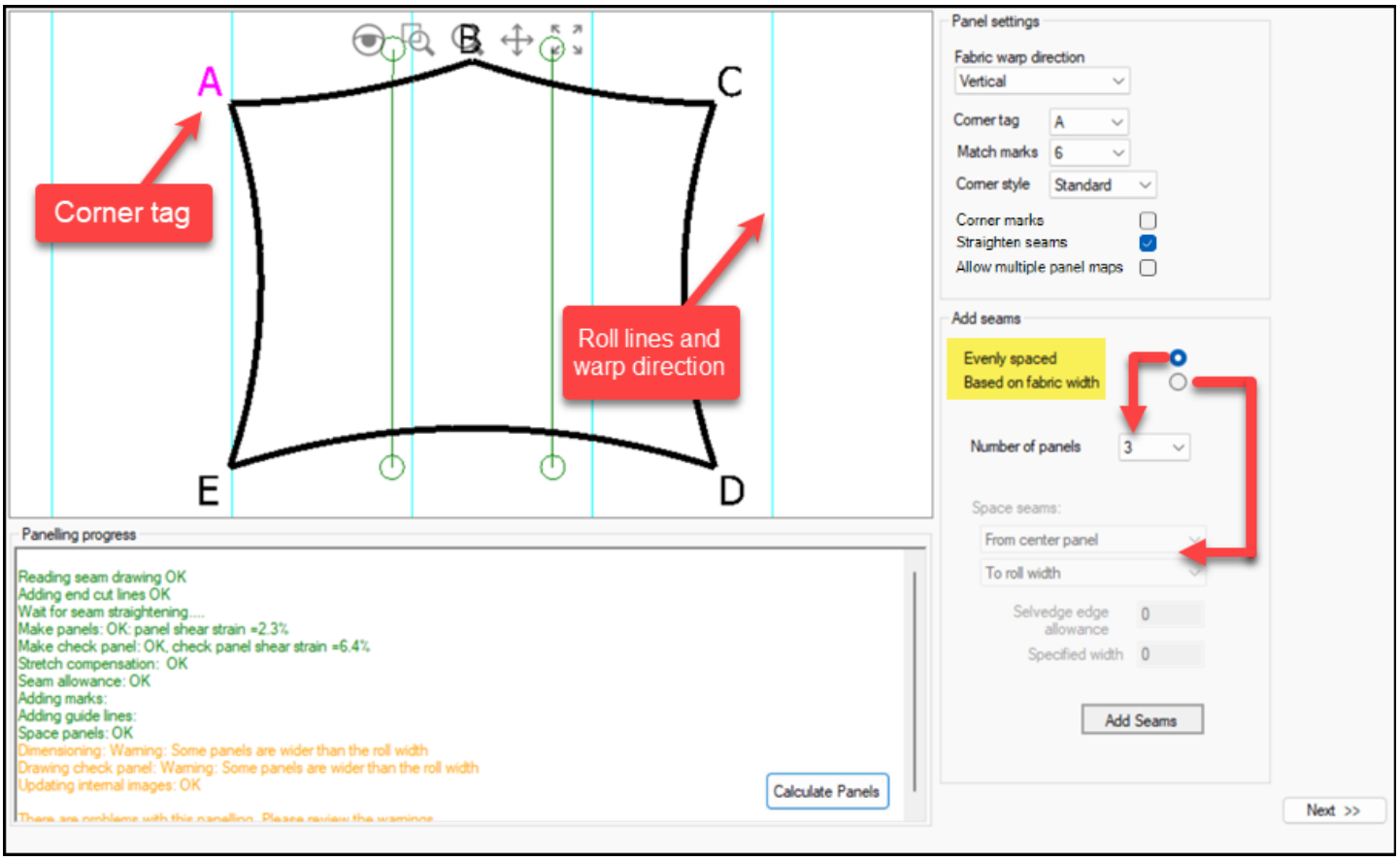
You can zoom in, orbit in 3D, or pan the drawing using the buttons provided, or by using the mouse:
Left button to orbit the model
Middle button (Scroll wheel pressed down) to pan
Scroll wheel to zoom in or out at the mouse location.

By default the image shows a representation of corner detail, such as D rings, EZ glides, and guys, with the sail truncated to fit. In models that have difficult corners (such as narrow triangular sails) the corner detail may be drawn incorrectly. In the case the corner detail can be turned off, and the sail, with no corner truncation, will be drawn. On difficult corners the sail may extend beyond the pole top, due to the corner truncation correction.

Seams

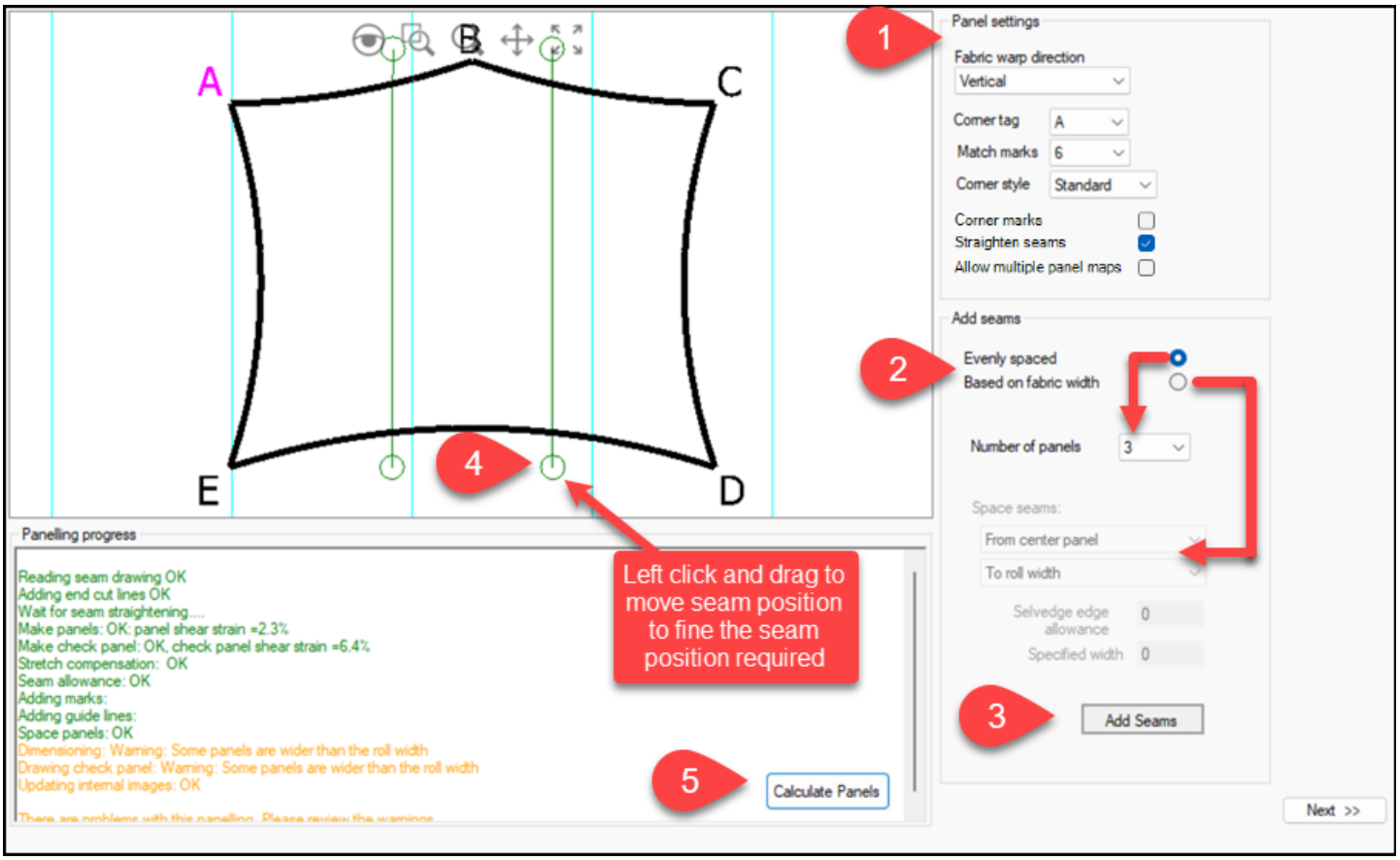
On this page the seam arrangement is shown on an image of the mesh outline, with additional information about the seam positions and warp direction. The seams can be added to be:

- Evenly spaced across the sail
- Spaced based on the fabric width

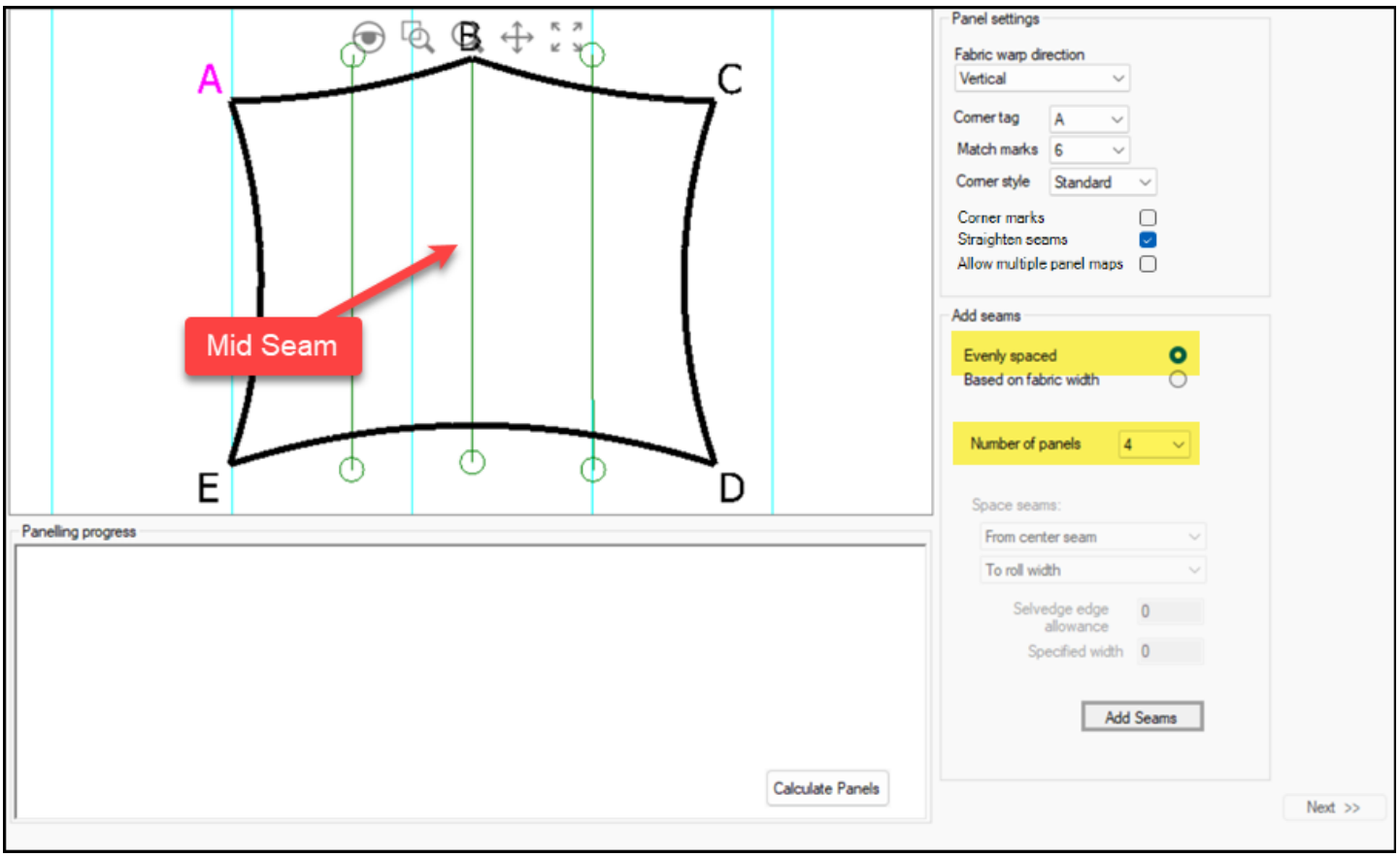


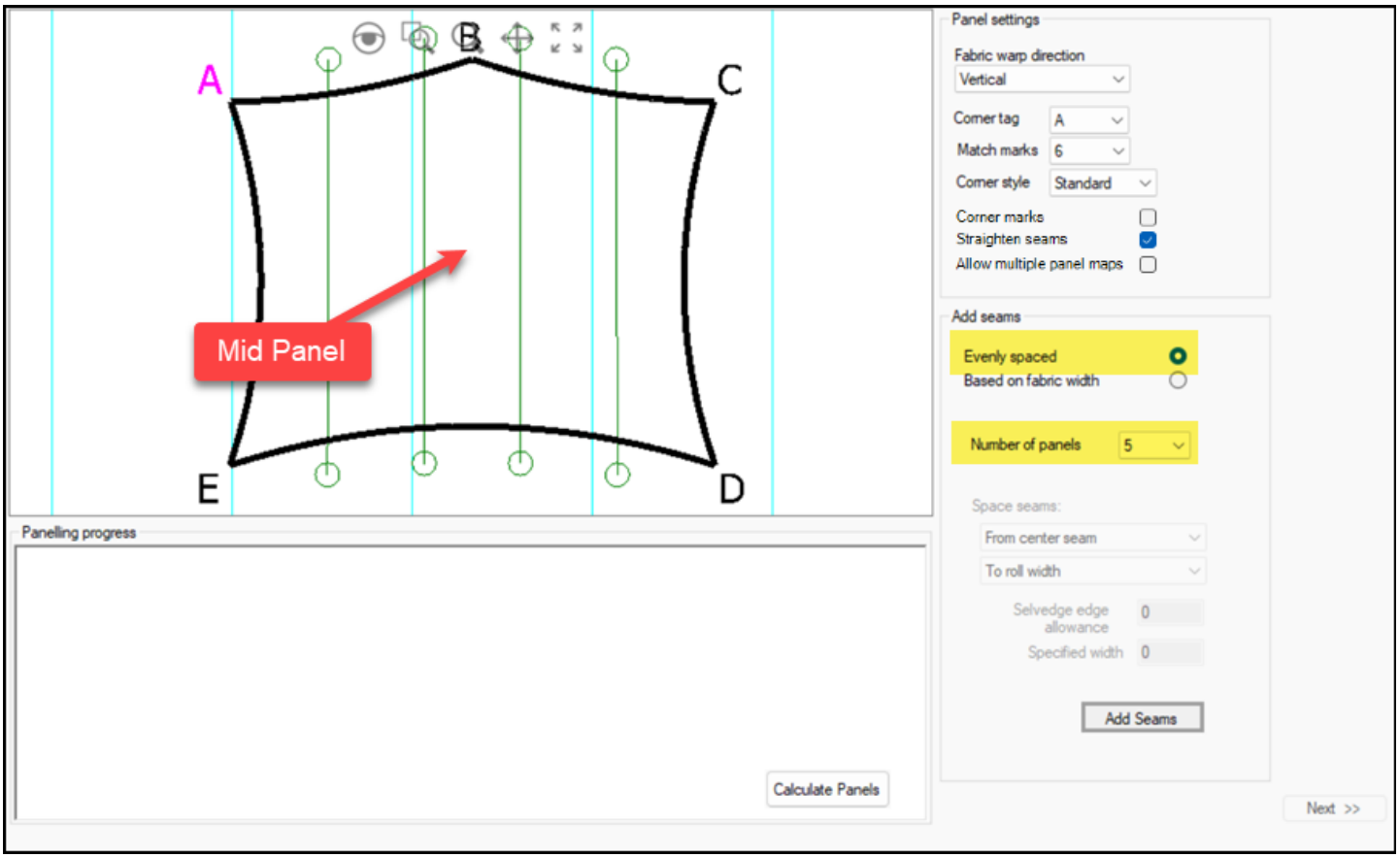
Basic workflow overview

1 - Select Panel Settings
2 - Select seam spacing as either:
    evenly spaced + number of panels or
    by fabric width + centre seam or panel + width
3 - Add Seams
4 - Adjust seams can also be moved using the mouse to fine tune the layout
5 - When the seam positions are acceptable click the "Calculate panels" button to get the program to calculate the panel shape(s).

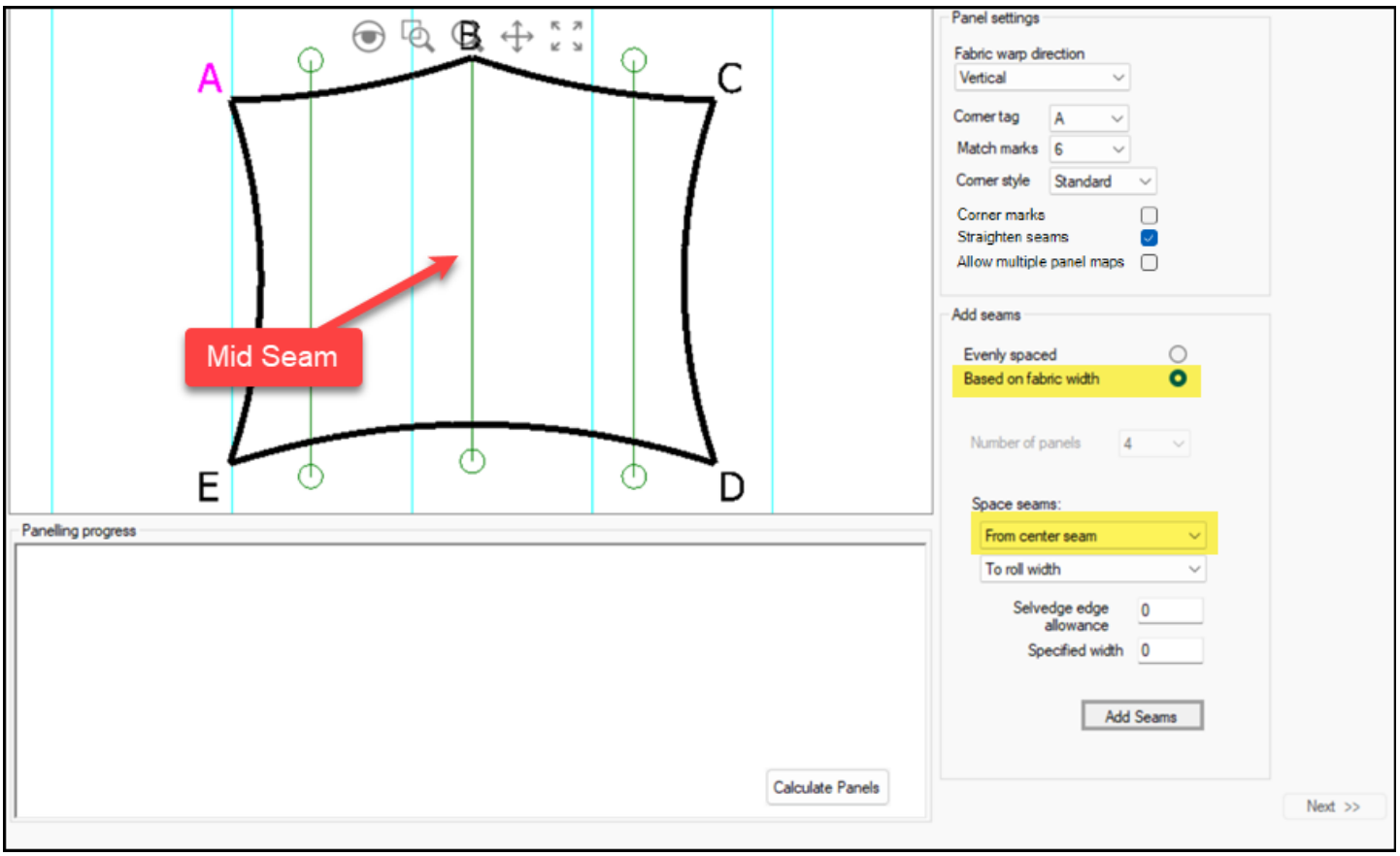


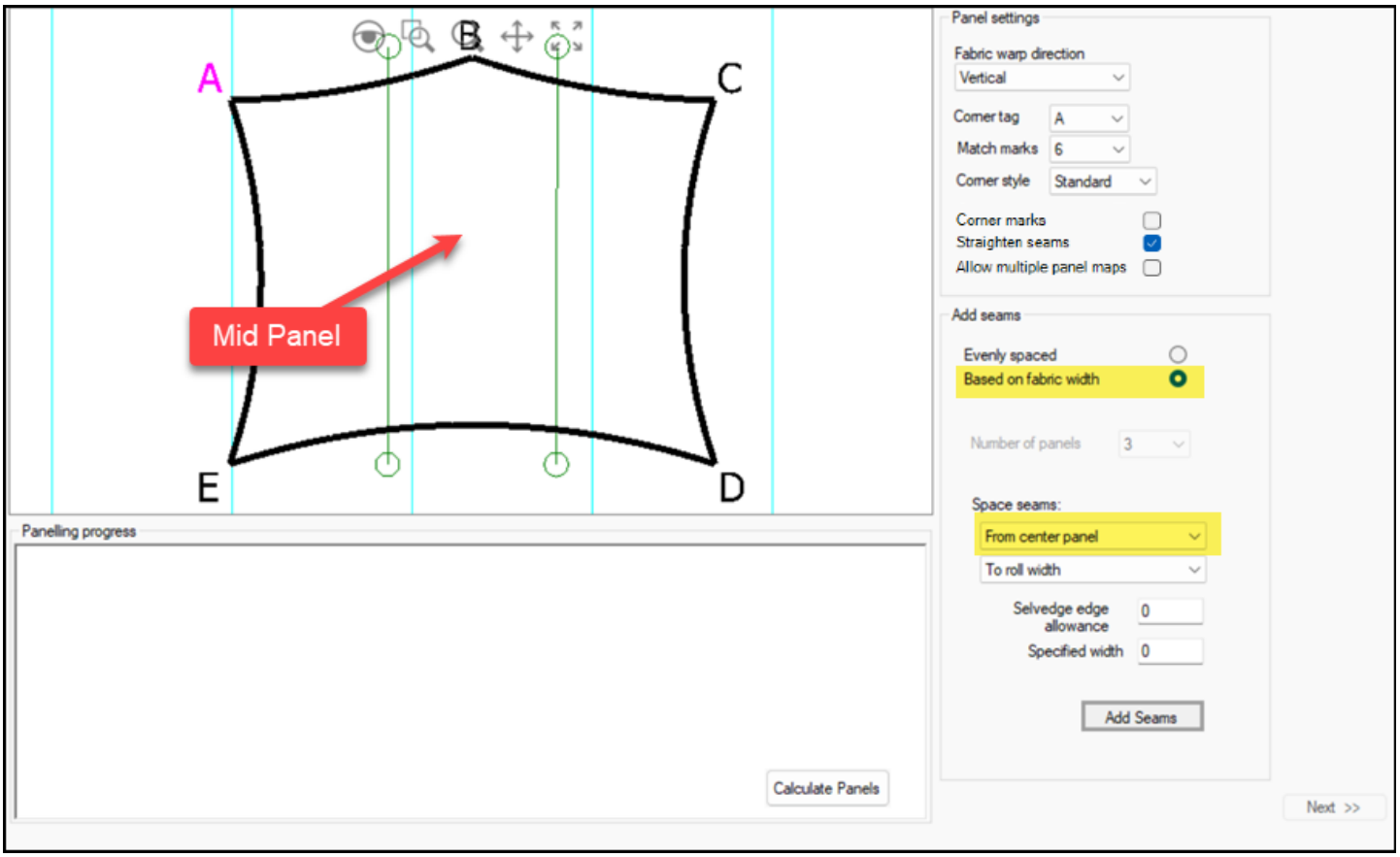
For 3, 5 and 6 sided sails split with the evenly spaced panels tool will produce panels with a mid seam if the number of panels is an even number or a center panel when the number of panels is uneven.





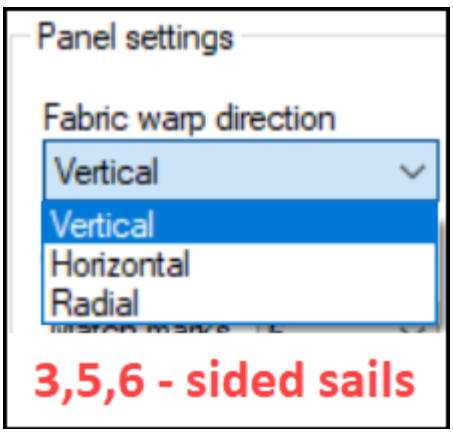
For sails split by the fabric width spaced panels tool can produce panels with a mid seam or a center panel based on the selected option.

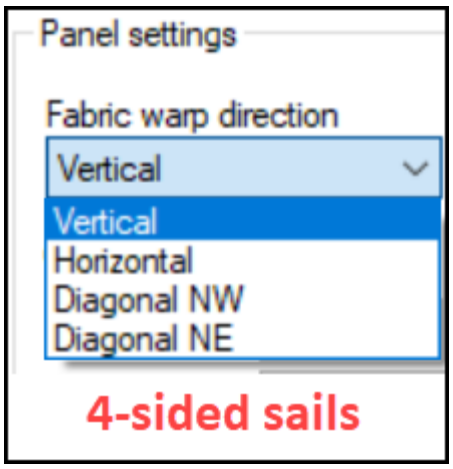




Panel settings

Fabric warp direction
This can be set to vertical, horizontal, and (depending on the sail) diagonal or radial seams.



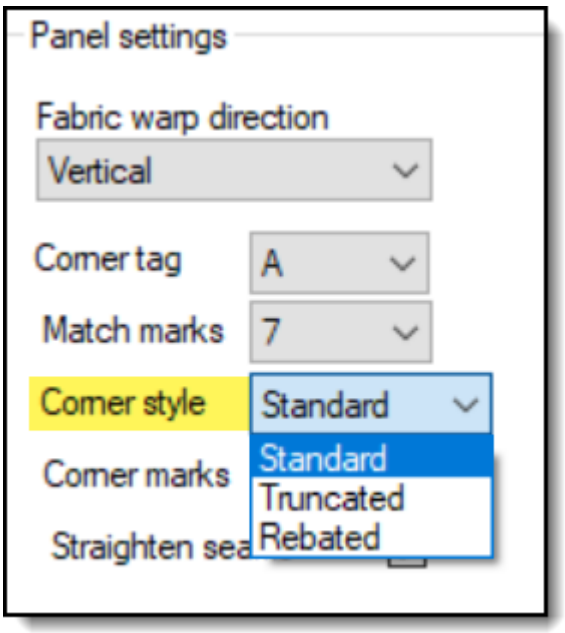


Corner tag
Identifies one corner as the tag corner. In manufacturing a mark can be made or a tag sewn in on this corner for identification during installation.

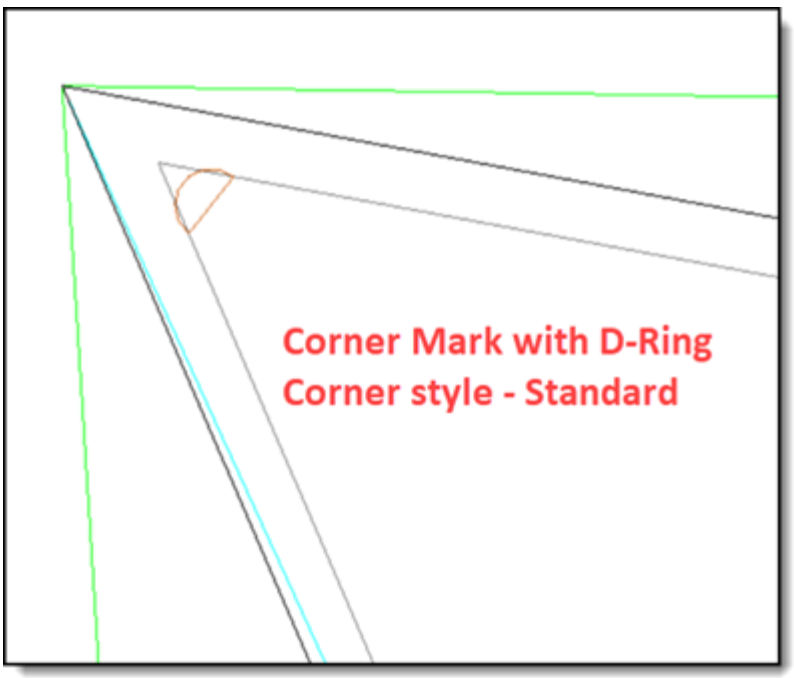
Match marks
Match marks can be added to seams to ensure seams are joined correctly during manufacture - this option is useful when using plotter/cutter machines and fabric which can be pen marked and when a mesh is split into multiple panels.

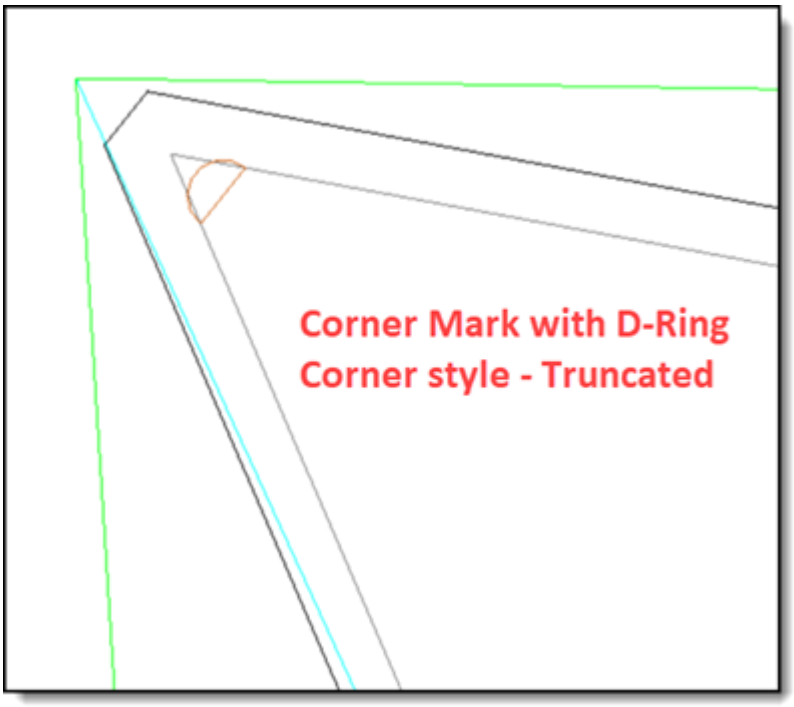
Short Video: Match Marks

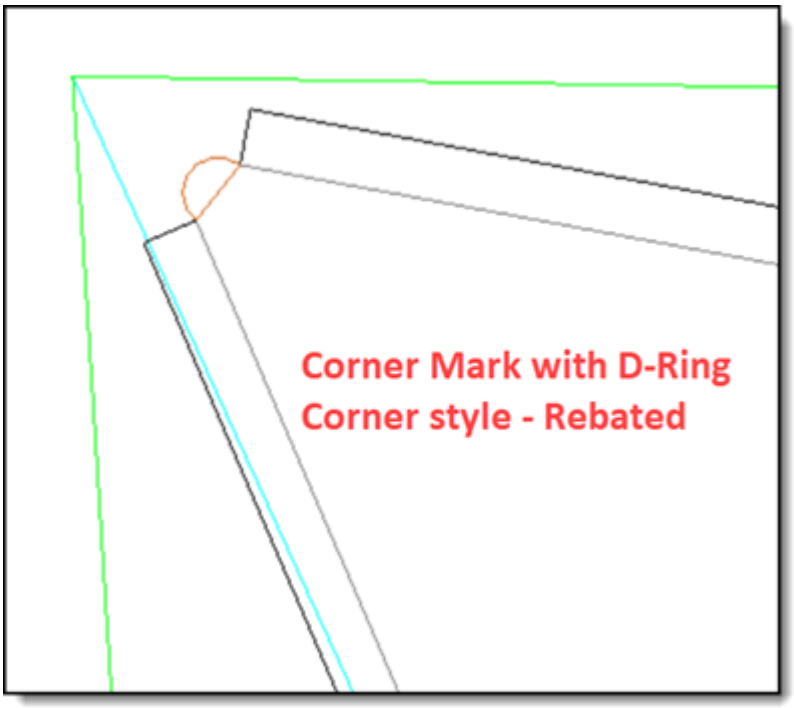
Corner style
The standard corner style is the default corner for hand cut shade sails and offset values provided in production reports can be used to locate corner fittings. In version 13 truncated and rebated corner styles were added for panels exported for plotter/cutter machines.



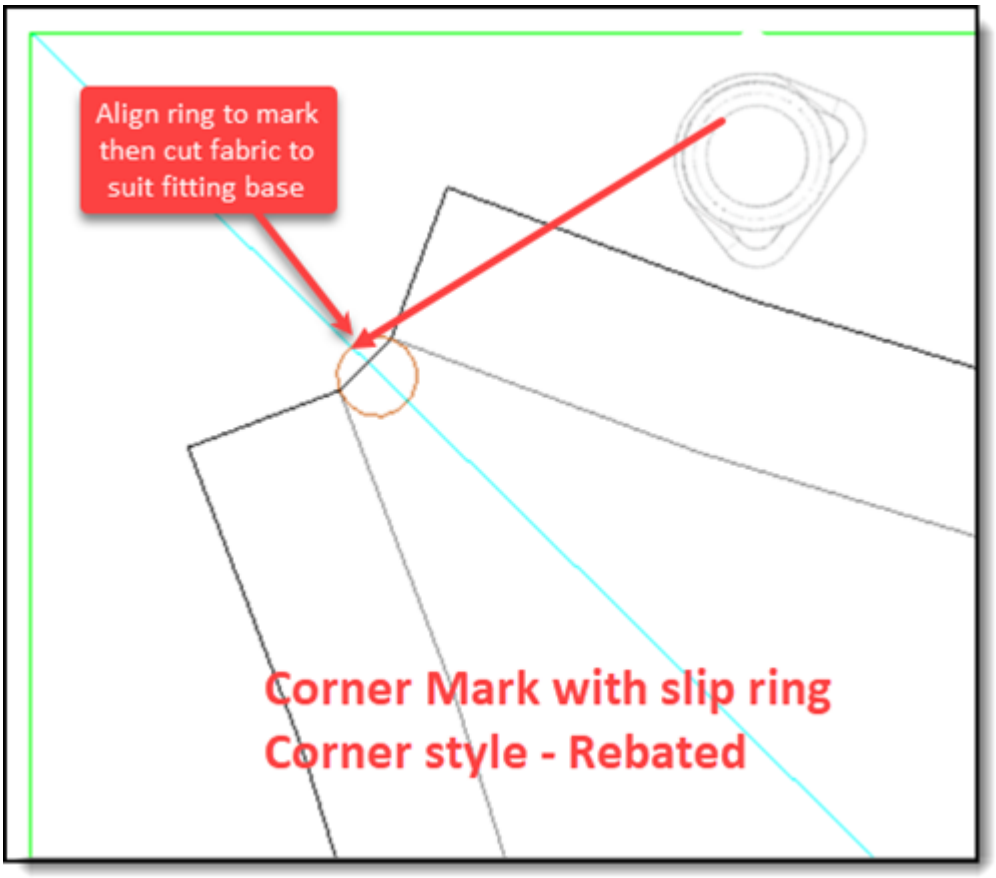
Short Video: Corner Styles

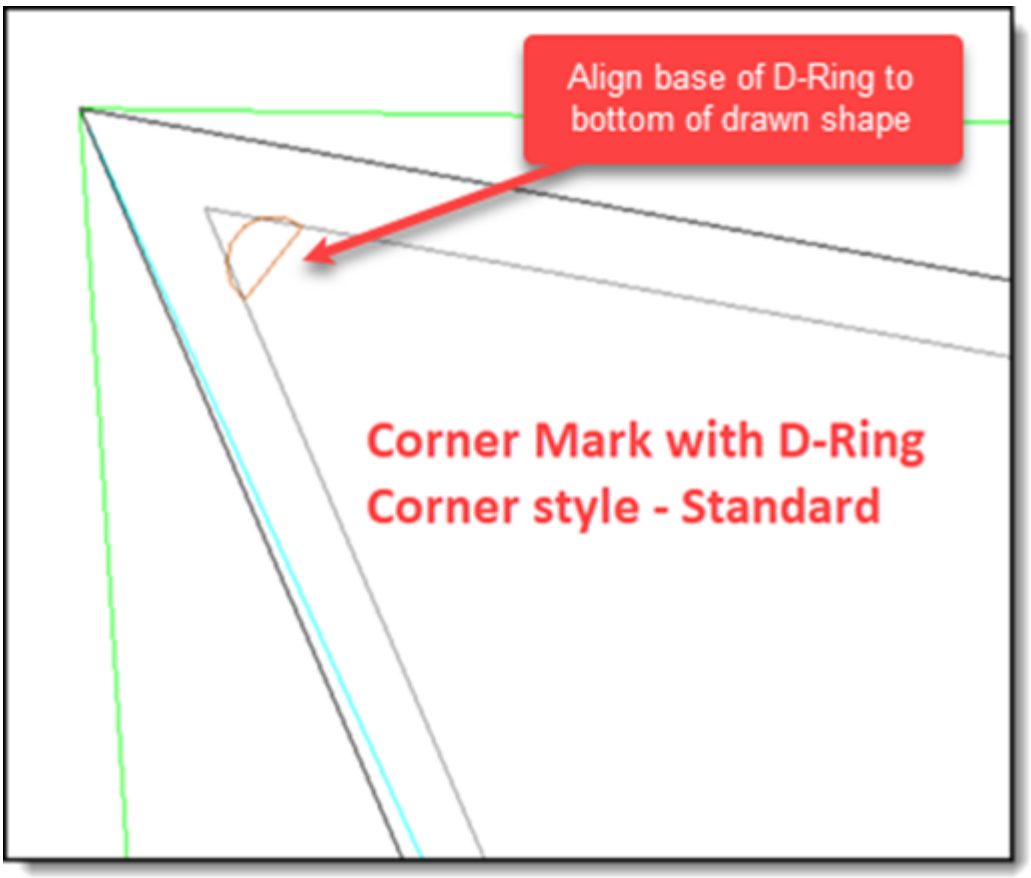






Corner marks
If selected the corner hardware (D-Ring, Ezy-Slide etc) will be accurately marked on the panel - these are shown in brown on the panels (see above examples) this option is useful when using plotter/cutter machines and fabric which can be pen marked. In the example of a D-Ring the base of the corner hardware will align with the rebated corner. In the example of a slip ring corner fitting (Ezy-Glide or similar) with a single edge cable running tangential to the fitting should be aligned with the tip of the ring (see image below) and the fabric should be manually cut/adjusted/trimmed to suit the fitting and to ensure the cable runs smoothly from the cable pocket around the ring as shown by the corner mark ring position.





Short Video: Corner Fittings

Straighten seams
To make the panel edges straighter, you can specify "Straighten seams". This will attempt to straighten each seam, and will minimize the panel edge curvature and will average seam dips. Note that with some seam specifications it is not possible to straighten the seams (for instance they might go outside the mesh edge), and generally straight seams do not look as appealing as the natural seams.

Allow multiple panel maps
Checking this option will allow more than a single panel to be mapped using panel mapping...more.

General information

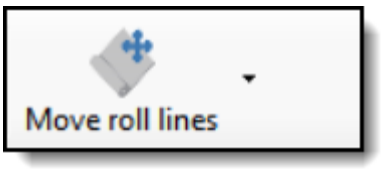
Seam lines
The green lines with circles at each end show the positions of the seams. The seam lines can be moved holding down the left mouse button in the green circles, but they will need to stay on the same mesh edge e.g. vertical seams can only run from the bottom to top edge and cannot be movd to a left or right edge. Similarly, horizontal seams can only cross between the left and right edges. If a seam line end does not have a green circle then it can't be moved.

The points where the seam lines cross the mesh edges define the beginning and end points of that seam. Between the beginning and end points the seam is curved to follow the overall shape of the mesh. This gives seams that are evenly spaced in the mesh, and visually echo the shape of the sail. These are usually the best looking seams, but can results in excessively curved panel edges.

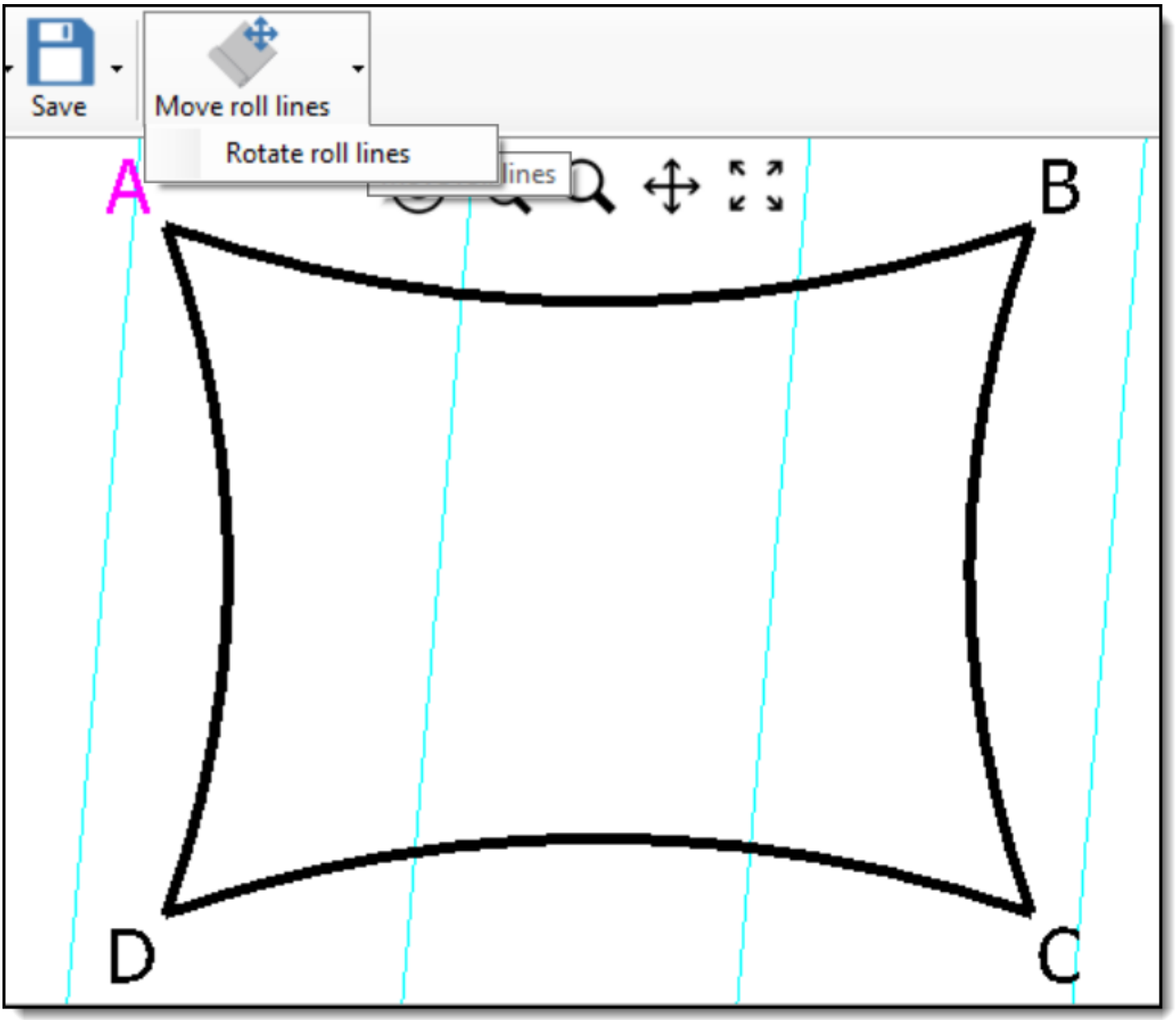
Roll width lines.
The cyan lines are guides to show the warp direction for the paneling, and are spaced apart by the roll width. This lets you judge how many panels will be required to make the sail, but be aware the mesh outline is 3D and therefore the panels may get bigger during the paneling / flattening process, and when the seam allowance are added.

The cyan lines can be moved sideways to help with judging if a panel will fit on the roll, by selecting the move roll lines button then holding down the left mouse button positioned on a roll line and dragging the lines sideways.

In the toolbar you can click on buttons to:



The cyan lines can be rotated to define a different warp direction, by selecting Rotate Roll Lines which is accessed via the dropdown arrow on the right of the Move roll lines tool.This can help to fit panels on the roll better. For most paneling the warp direction is directly along the cyan lines. For radial paneling, each panels center line is oriented along the cyan lines.



Short Video: Rotate seams

- **Evenly spaced seam lines**

Specify the number of panels, and click the "Make seams" button. The seams will be spaced across the mesh so that they are visually evenly spaced.

- **Seams spacing based on the fabric width.**

The green seam lines will be automatically adjusted to a defined width, often the roll width. This allows for most efficient fabric usage, but can result in seams that are not symmetrical, or seams that are close to an edge, which can be visually unattractive.

The seams can be adjusted to a defined width from an edge of the sail, or from the center. In sails that have a fixed seam line the seams can be adjusted outward from that line. If the paneling is going to use straight seams, then the adjustment should also use straight seams.

The finished panel width can be defined as the roll width, with an selvedge edge allowance subtracted from each side. Alternatively half roll width, or a specified width can be used.

The seam lines generated by the program should be inspected to make sure that they are not producing very narrow edge panels, or panels that will be hard to produce. Also the visual layout of the seams should be considered. Seams that are close to an edge will also not allow seam straightening.

The seam lines generated by the program can be adjusted by hand in the usual manner to visually improve the automatic seam placement.

- **Calculate panels.**

When you have the seams defined, click the "calculate panels" button. This will start the program to go though these steps:

a) **Flattening** (or Patterning) the model to create one or more flat, (2D) fabric panel(s). During the flattening process the panel will have to distort some. Shade sail can usually take up to 10% distortion without showing any distress (applies to light/flexible fabrics - stiffer fabrics may show stress wrinkles as low as 6%). The amount of distortion (shear strain) is reported, and if it exceeds a 10% limit a warning is given.

b) **Shrinking** the panel in warp and weft to allow for stretch on installation. The amount of shrink is specified, and is applied in the warp direction defined by the cyan lines.

c) **Hem and seam** allowances added to each edge.

d) **Dimensioning** & annotating the panel. The panel is dimensioned so that it can be laid out on a lofting floor using triangulation. The curved edges are then defined by mid point dip values, so that the curve can be approximated using a bendable rod. If the maximum curve dip is more than 5% away form the center of the panel seam then the distance down from the top of the panel will also be given to locate the point.

Normally the paneling progress is shown in Green. If there are warnings they will be in Orange, and problems that prevent paneling will be in Red

Short Video: Shaped seams

Notes on diagonal warp.

Diagonal warp can be applied to 4 pole structures. Using diagonal seams makes a seam that splits the corner angle on two of the corners. This effectively halves the panel corner angle, which can lead to problems when the hem allowance extends the panel corners excessively.

The default diagonal warp seam is a subtle curve that ensures that the corner angle is divided evenly between the 2 panels. This curve is no problem if the panel is cut or plotted automatically. If the curve is created with a flexible straight edge with a center dip value, it will only be an approximation to the subtle curve. In this case the user must judge if the curve is acceptable, particularly in the corners.

When seam straightening is used with diagonal warp, the corner angle is no longer divided equally between two panels, and one panel may have a very narrow corner. The user must judge if this is acceptable for the particular job.

Diagonal warp is not supported with Mid poles. It could be if enough users request this feature.

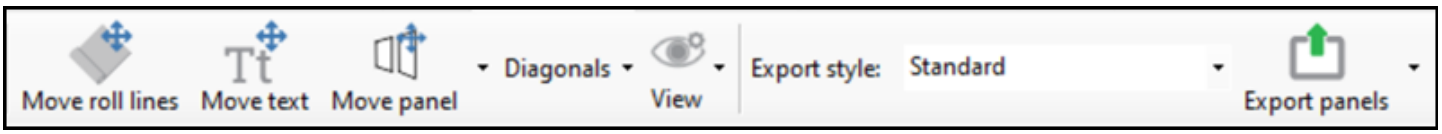
Notes on seam straightening.

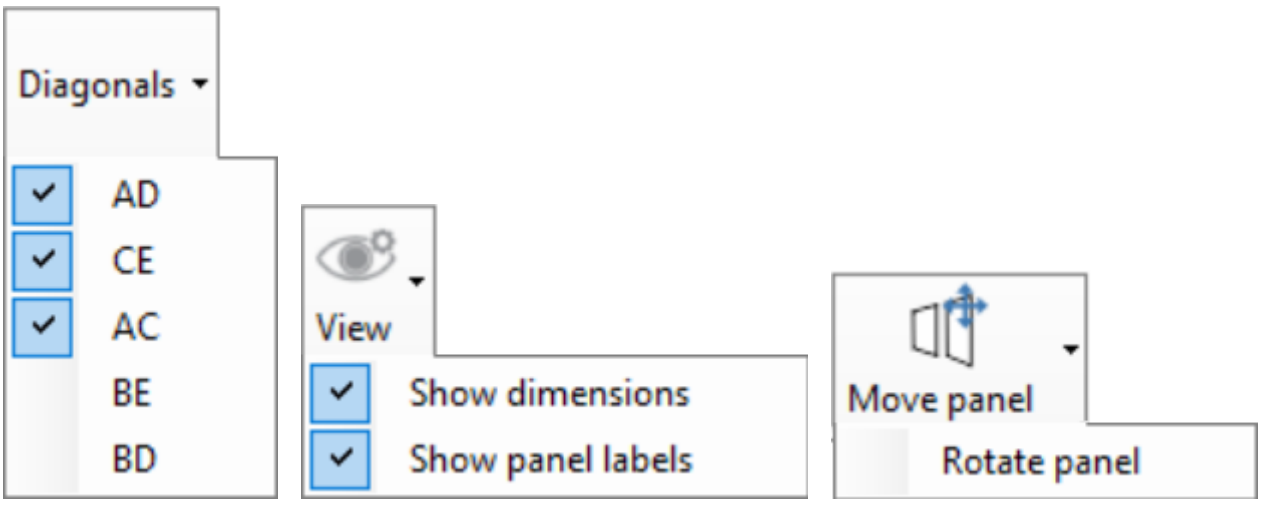
MPSD by default produces seams that are evenly spaced across the model. This gives a natural look to the seams, keeps the panels locally the same width as their neighbors, and avoids mid parts of the panels from becoming very narrow.

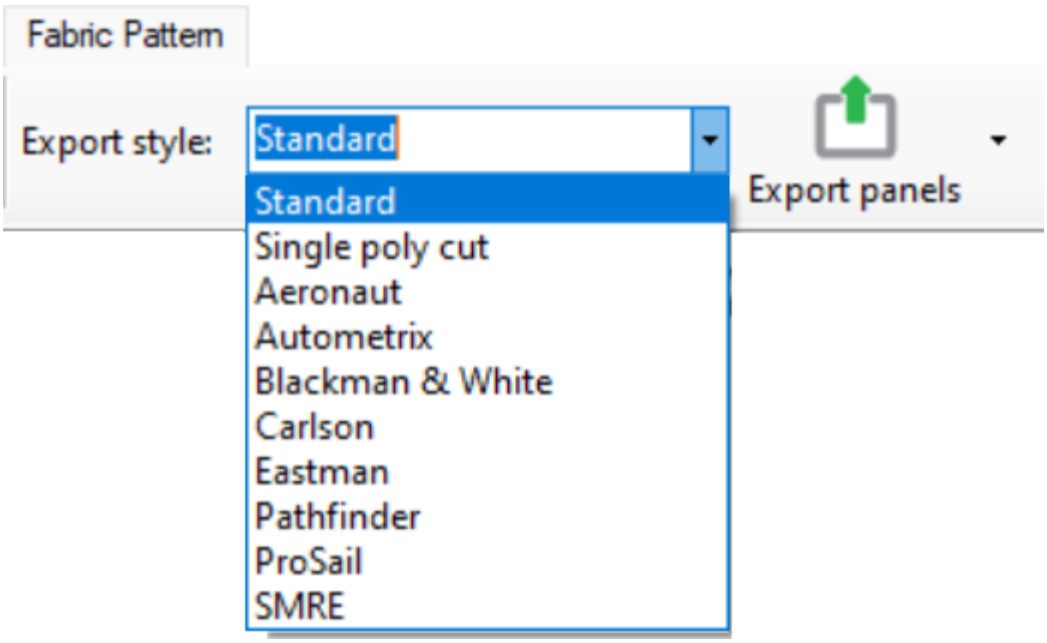
To lower production costs there is a requirement for straighter seams. These seams may not look as nice, and may be placed close to the model edge. It is up to the user to judge if the seam straightening that MPSD applies is satisfactory for the particular job.

Fabric Pattern

On this page an image of the flat, 2D fabric pattern(s) is shown. Menu items are shown below along with descriptions:





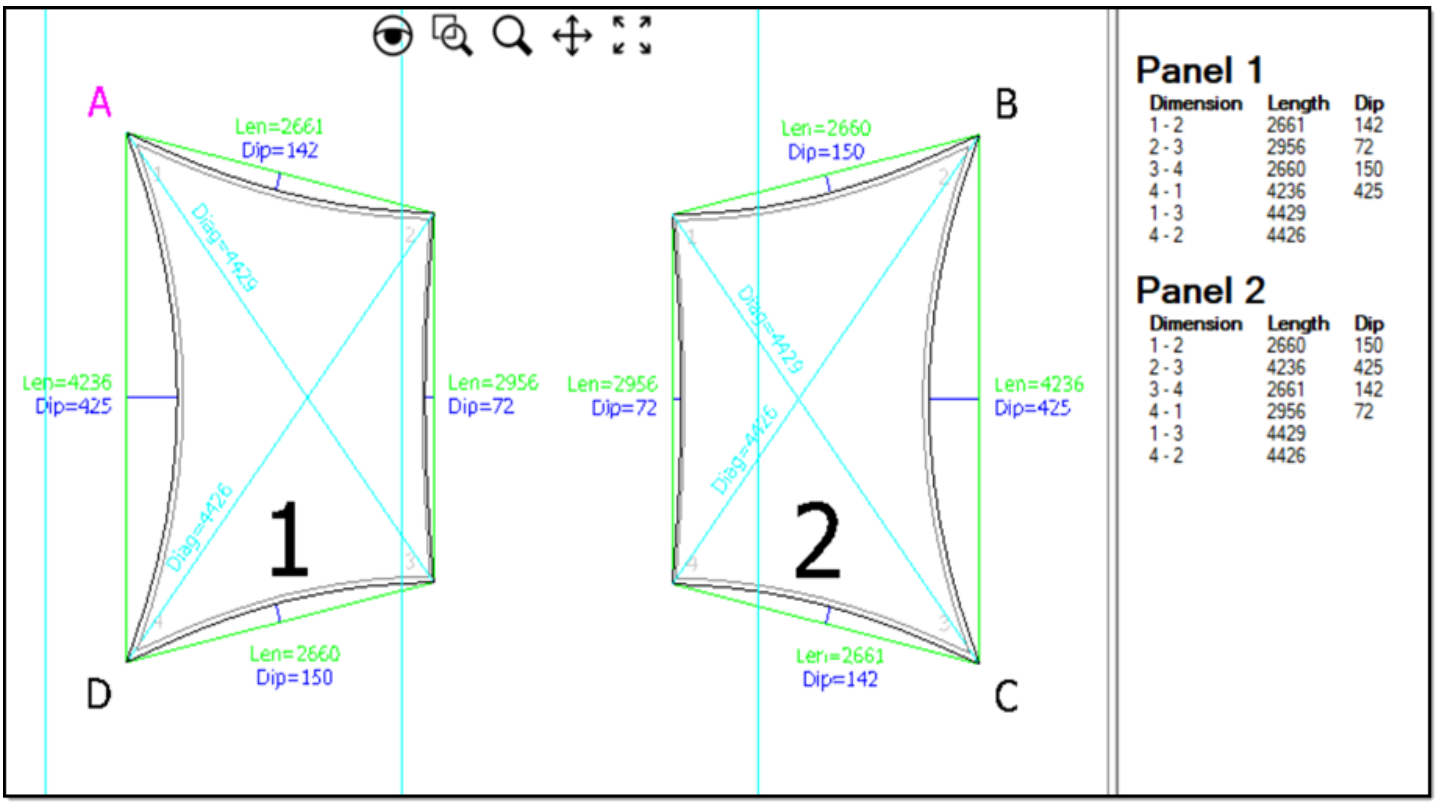


In the toolbar you can click on the menu buttons to:

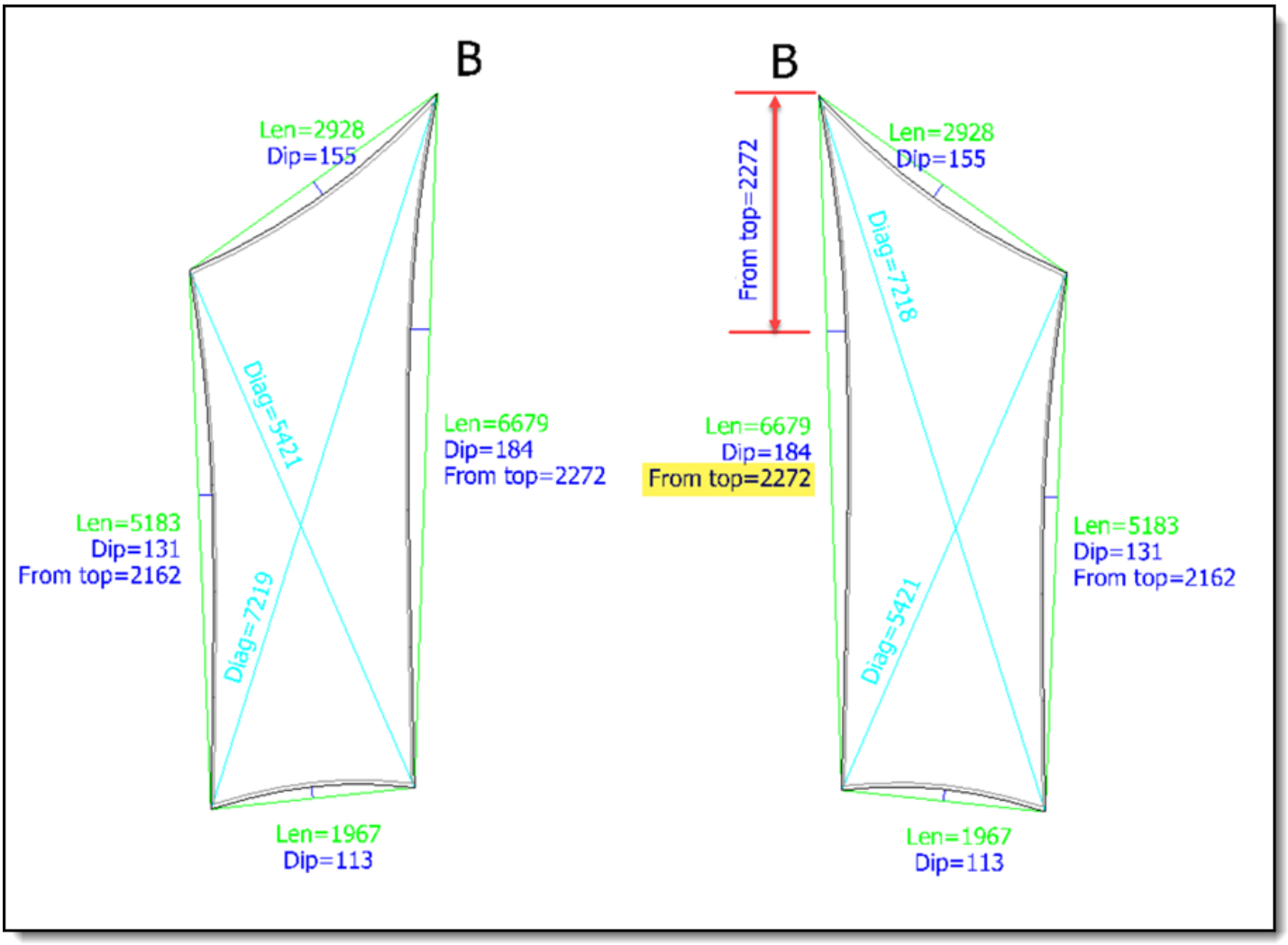
- Move roll lines — move the roll lines to judge panels against to roll width
- Move text — move text to avoid overlaps
- Move panels — move and from the dropdown option, rotate panels and reo patches
- Diagonals — show/hide additional diagonal on drawing when available
- View — show/hide dimensions and panel labels
- Export style — select the style of dxf file format to suit different plotter/cutters
- Export panels from the Export style — export the panels for use with a cutting machine selected

On this page an image of the flat, 2D fabric pattern(s) is shown, with the construction dimensions.

Tabulated dimensions are also shown on the right of the panels. These refer to the straight line length between nominated points (e.g. corners 1-2) and the dip value typically midway between the straight line and the maximum dip of the panel edge.



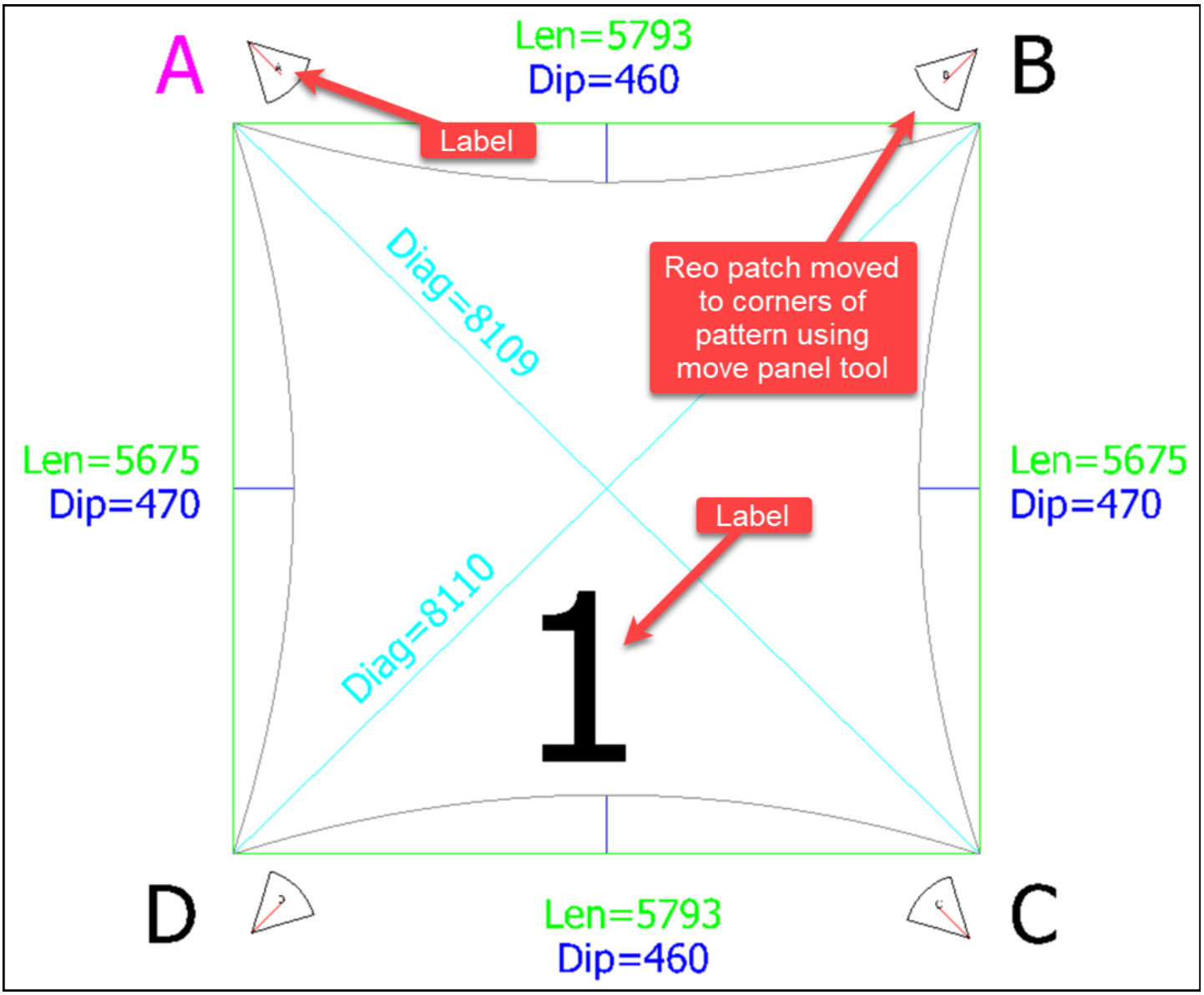
Dimensions are in the unit system specified on the Start tab. In circumstances where the max curve dip is more than 5% away from the center of the seam edge length an additional dimension is added to locate the max dip point.



Pattern labels and dimensions are shown on the panels and reo patches - these can be hidden using the View menu tool.

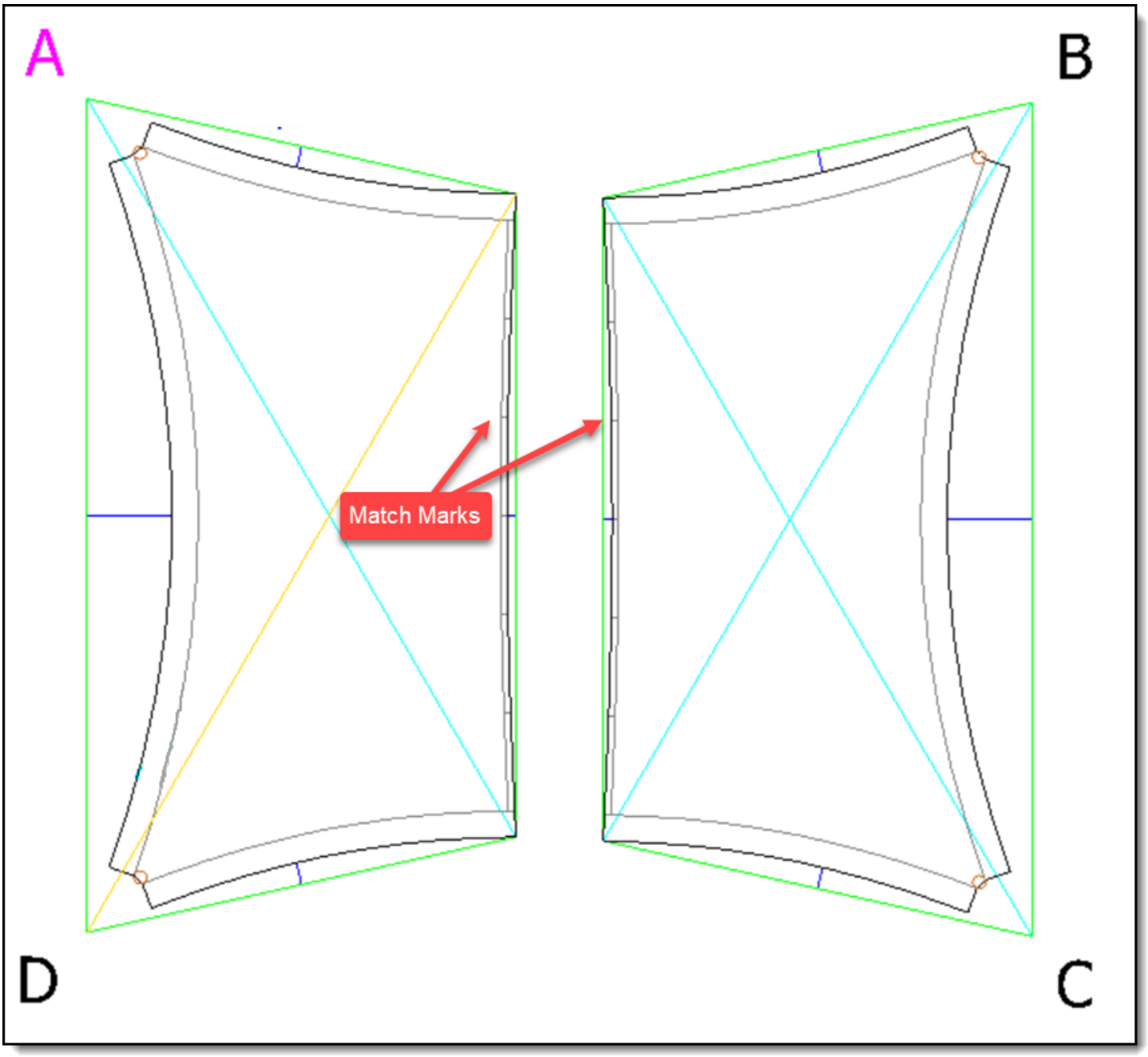
Reo patches if selected, are now (V15) shown on the Pattern page. A line has been added to the reo patches (V15) which represents the corner forces reaction direction.

Panels and reo patches can be moved and/or rotated using the Move menu tool. Click on the tool then click and drag a panel to the new location. The dropdown arrow on the right of this button allows you to rotate a panel so seams can be aligned as required.

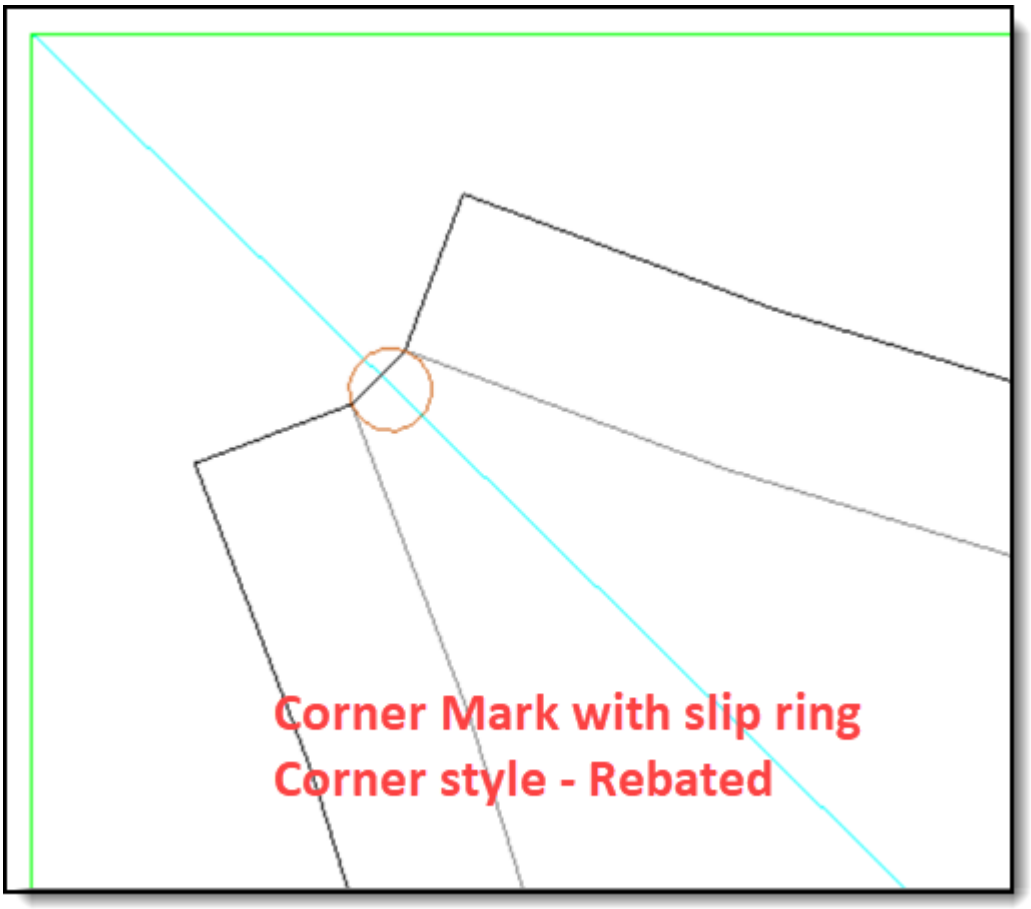


The hems and seams are shown, which allows checking of the selected hems and seams.

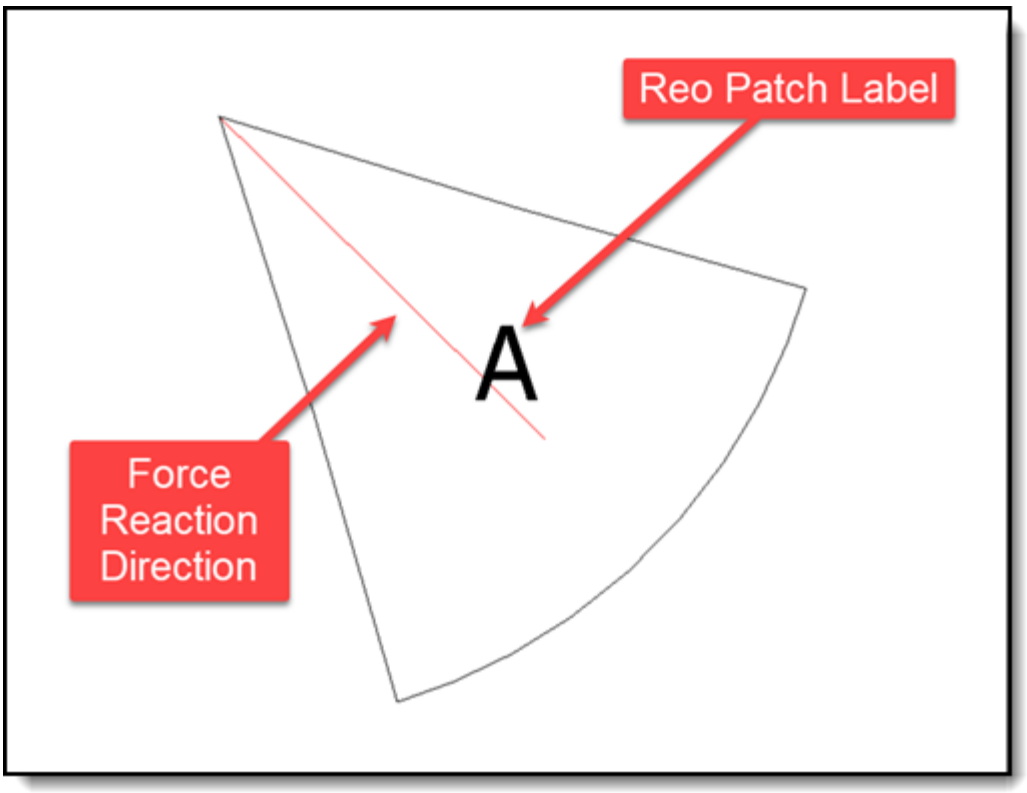
Match marks are shown if the number of marks on the seams tab is set to any number.



Corner marks are shown in brown if the checkbox on the seams tab is selected.



Corner reo patches include a line indicating the force reaction direction. This is also added to exported corner reo patches.



The warp (fabric roll) direction is always shown as vertical. Cyan roll width markers make it easy to check if the panels fit on the roll OK. The cyan lines can be moved sideways to help with judging if a panel will fit on the roll, by selecting the move roll lines button then holding down the left mouse button positioned on a roll line and

dragging the lines sideways.

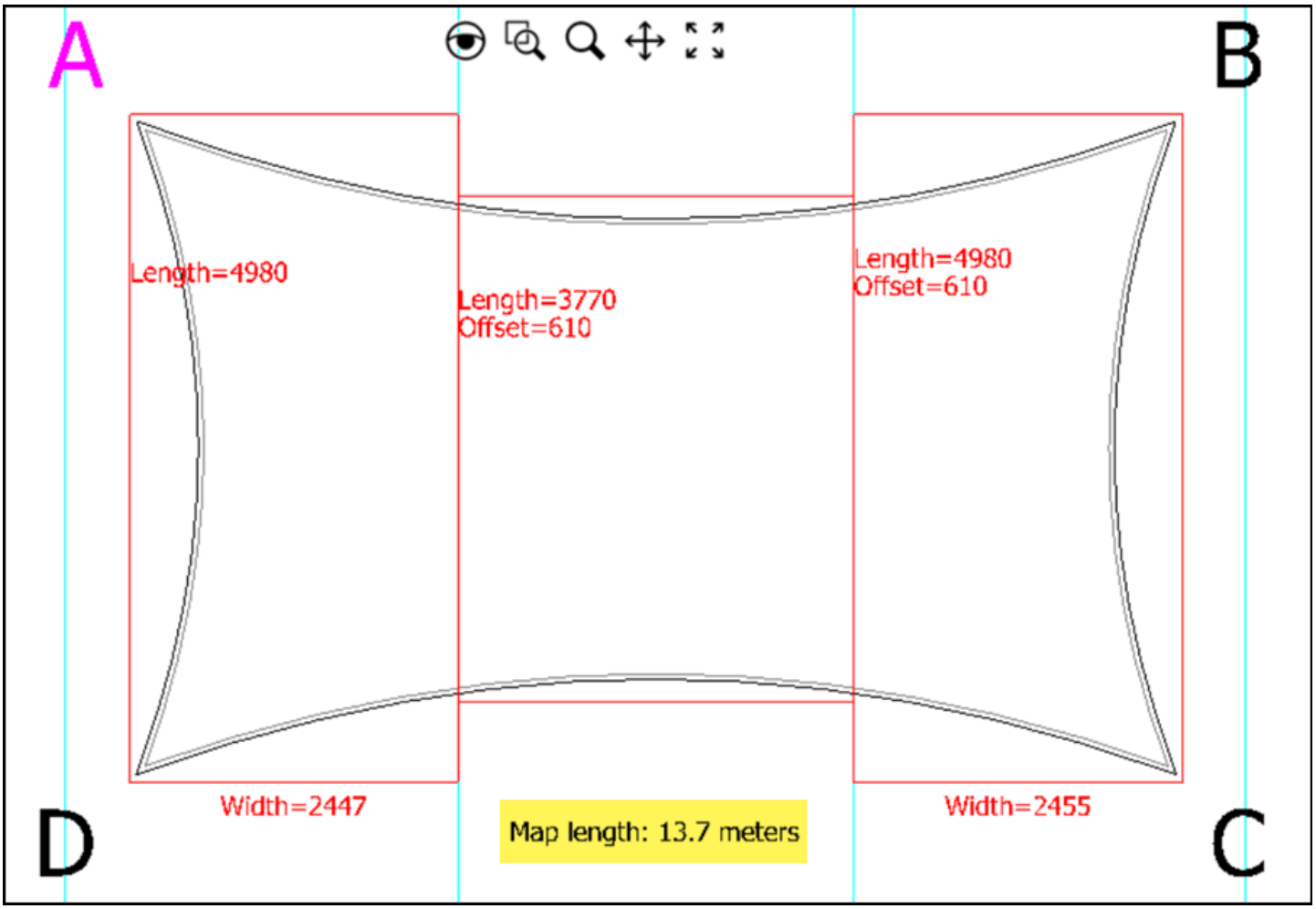
On some panels, the dimension text for one edge might overlap another text. Usually the text will still be readable, but it is possible to nudge the text into a different position by Clicking the "Move text" button in the toolbar then follow the instructions to select the text and then drag to the new position.

If a mid point was specified on an edge, it is possible that the mid point on the sail is not on a straight line between the corners, due to shear distortion, fabric stretch, and hem allowances. In this case a Center Offset (Coff) will be drawn in, which shows the offset of the midpoint from the straight line between the corners. A positive value indicates the center offset is a point inside (toward the sail center) the line between the corners. A negative value is the opposite, i.e. outside the line between the corners which can occur if the center link length is shorter than the corner links.

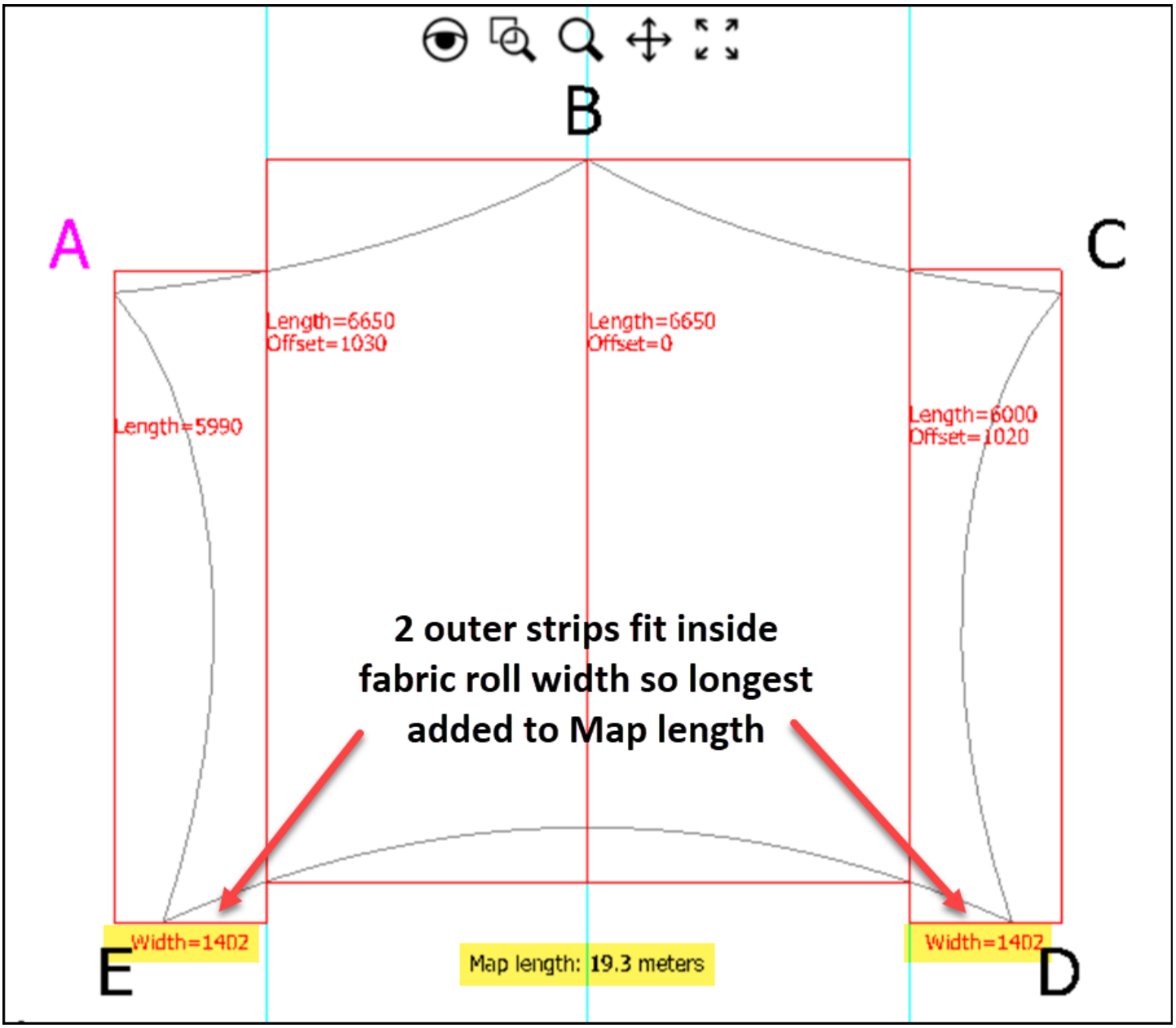
Panel Mapping

Panel Mapping - introduced in version 11:

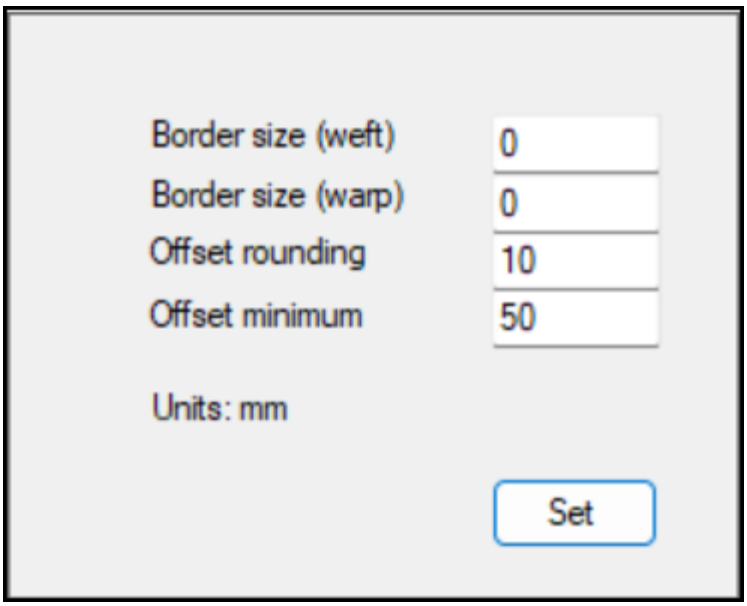
The tool has been added to assist companies who join flat fabric strips together and then cut a pattern from the sheet. This feature functions when the number of seams is set to one so the pattern is for the complete sail as a single panel.



By moving the roll lines (left click and drag any cyan line) panel mapping will dynamically split the single panel and show the size of the fabric strips required to make the final pattern including a total fabric amount required highlighted in yellow.



If the outer fabric strips will fit inside fabric roll width then the program will take the longest of the two and add this to Map length.



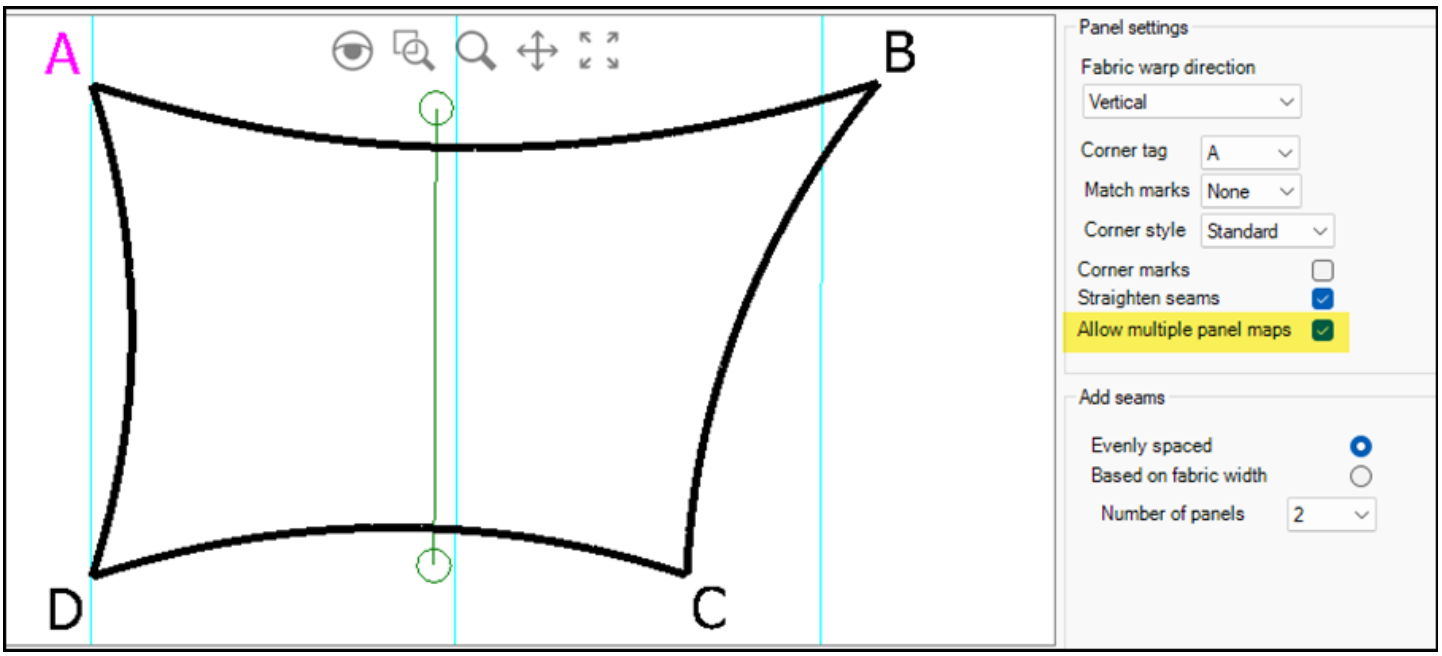
Menu Items:

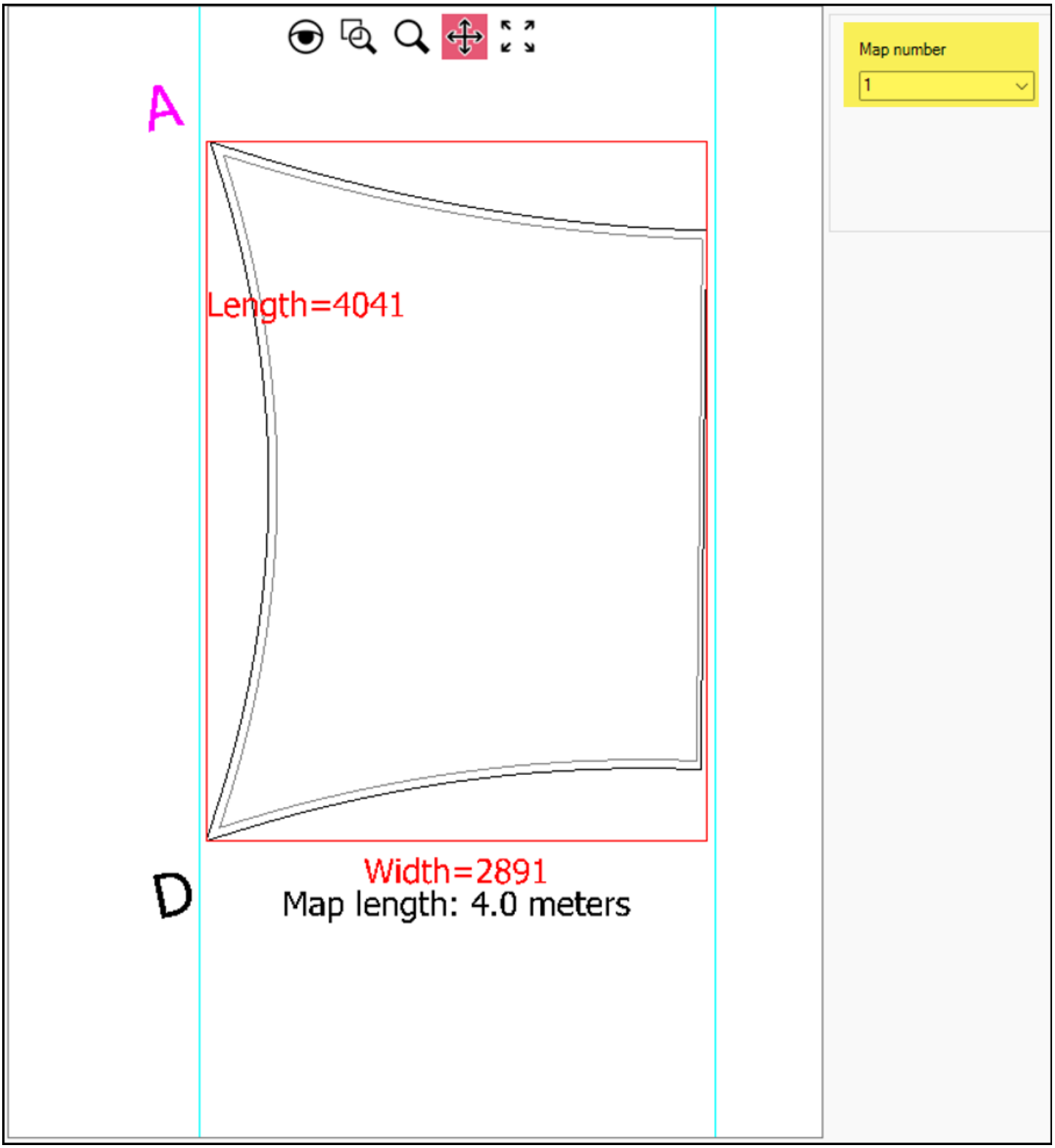
- Roll lines represent fabric widths which are defined by the fabric selection less internal seam widths specified on the materials tab.
- Border size (weft) defines additional fabric allowance to the left and right of all strips as well as the left side of the left most strip and right side of the right most strip
- Border size (warp) defines additional fabric allowance to the top and bottom of all strips.
- Offset rounding defines the minimum offset roundup value - for example a strip with an offset value of 510mm with Offset rounding set at 0 will change to 550mm when the Offset rounding is set to 50mm
- Offset minimum sets the minimum offset distance between strips. For example if this is set to 6" then a strip which has an offset of 2" will be increased in length to be the same as the adjacent panel.

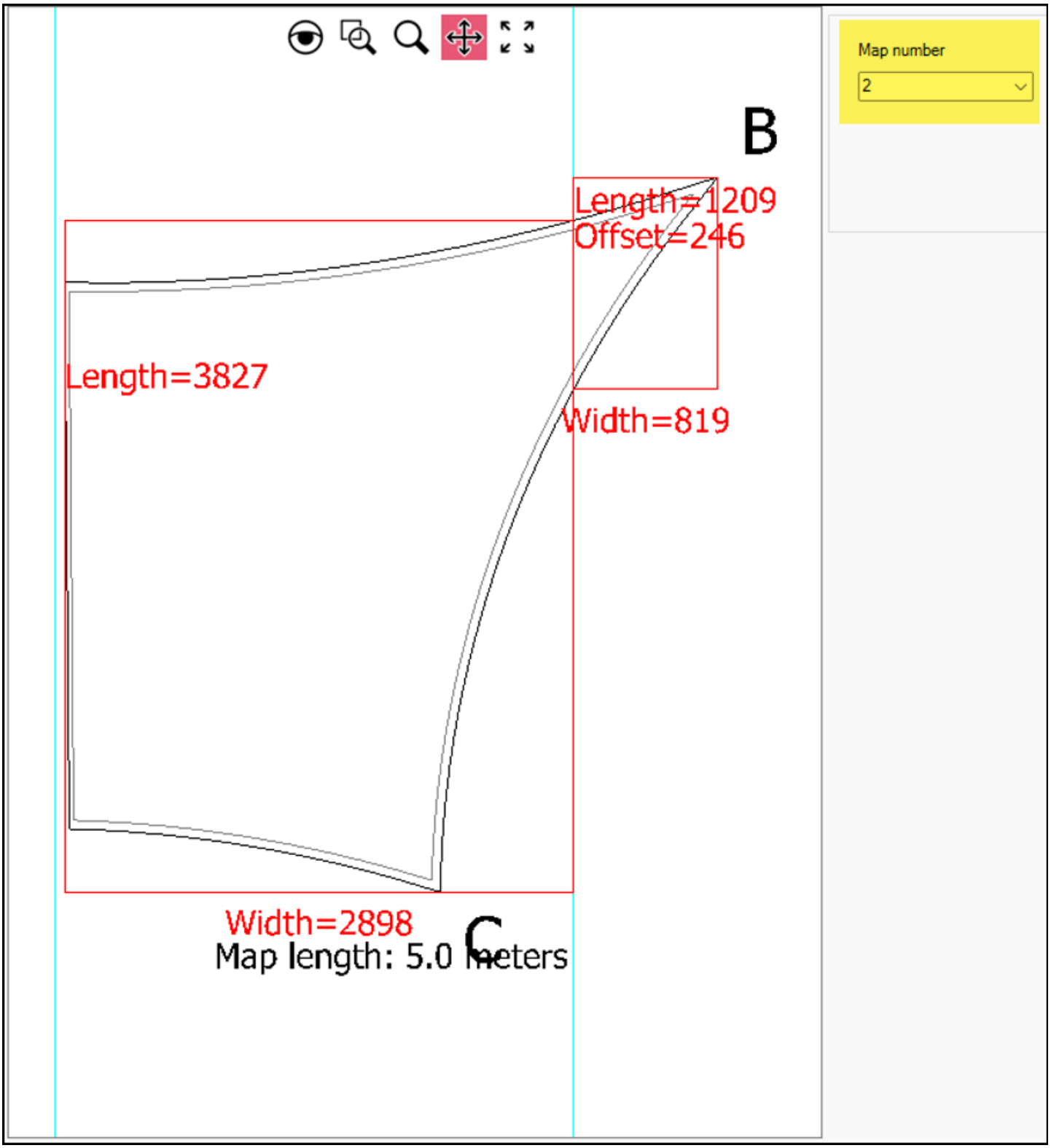
Note: Ideally shade sails are made by joining shaped fabric strips (i.e. with curved seam edges) to form a natural 3D shape with even tension throughout the membrane.

Short Video: Panel mapping operation

Multi-panel Mapping - introduced in version 16:
Earlier versions of Mapping were limited to a single panel map for the complete sail which works well for sails with less 3D height differences i.e. flatter sails such as triangles or sloping sails. Best practice for sails with good 3D forms is to split the mesh into more than a single panel so 3D shape can be absorbed by adding shape in the seams. In V16 a new option is available on the seams page to allow multiple panel maps. This allows for breaking a well shaped sail into 2 or more panels at the same time to provide the option to further sub-divide the panel in mapping to cut off corners etc. - see video link below.



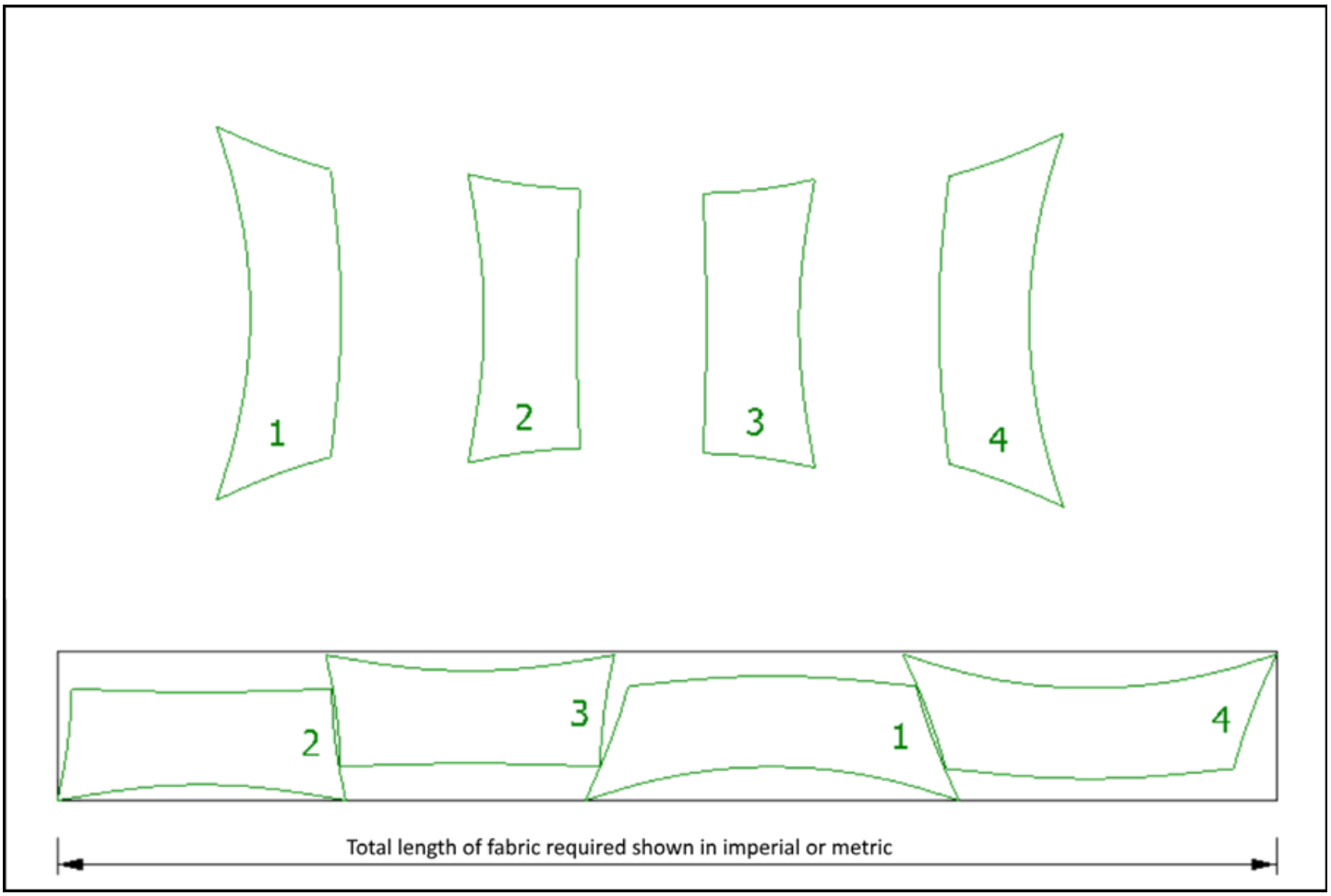

Map number
1
A
Length=4041
D
Width=2891
Map length: 4.0 meters



Short Video: Multi-panel Mapping

Nesting

MPSD Nesting is an optional feature which automatically arranges fabric panels to fit inside fabric width to minimize fabric waste. This powerful new feature is simple to use to quickly determine the minimum length of fabric needed to make the sail saving time and money.

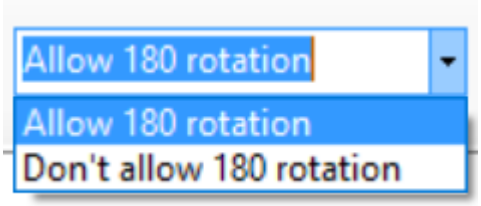


In the toolbar you can control several nesting controls including a button to redo the nest which would be used each time any changes are made to one of the below controls:

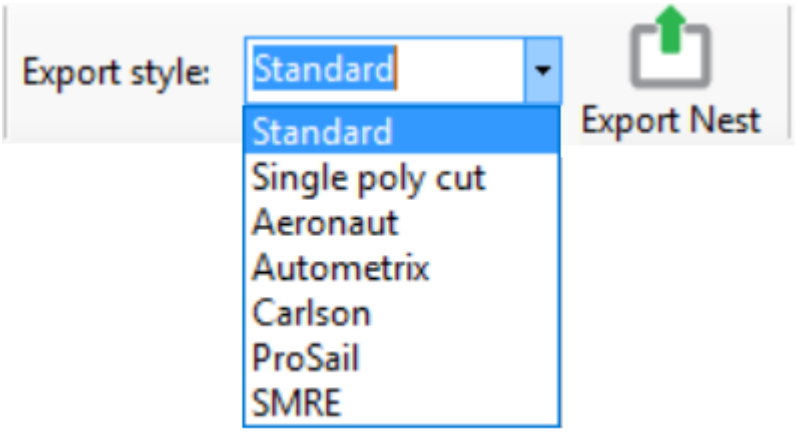
Spacing
Sets the buffer space between panels and from panels and the fabric roll edges.

Rotation Angle
Sets the limit that panels can be rotated from the fabric warp direction. This can help fine tune fabric utilization.

Allow 180 degree rotation
Many fabrics can be plotted in either direction in other words the panel can be rotated 180 degrees-this is typical for PVC coated fabrics. Many fabrics have a weave or pattern which prevents use of this fabric saving feature.



Export to plotter
Output Nest queue in dxf format ready for several built in plotting machines. If your machine is not included contact support@mpanel.com.

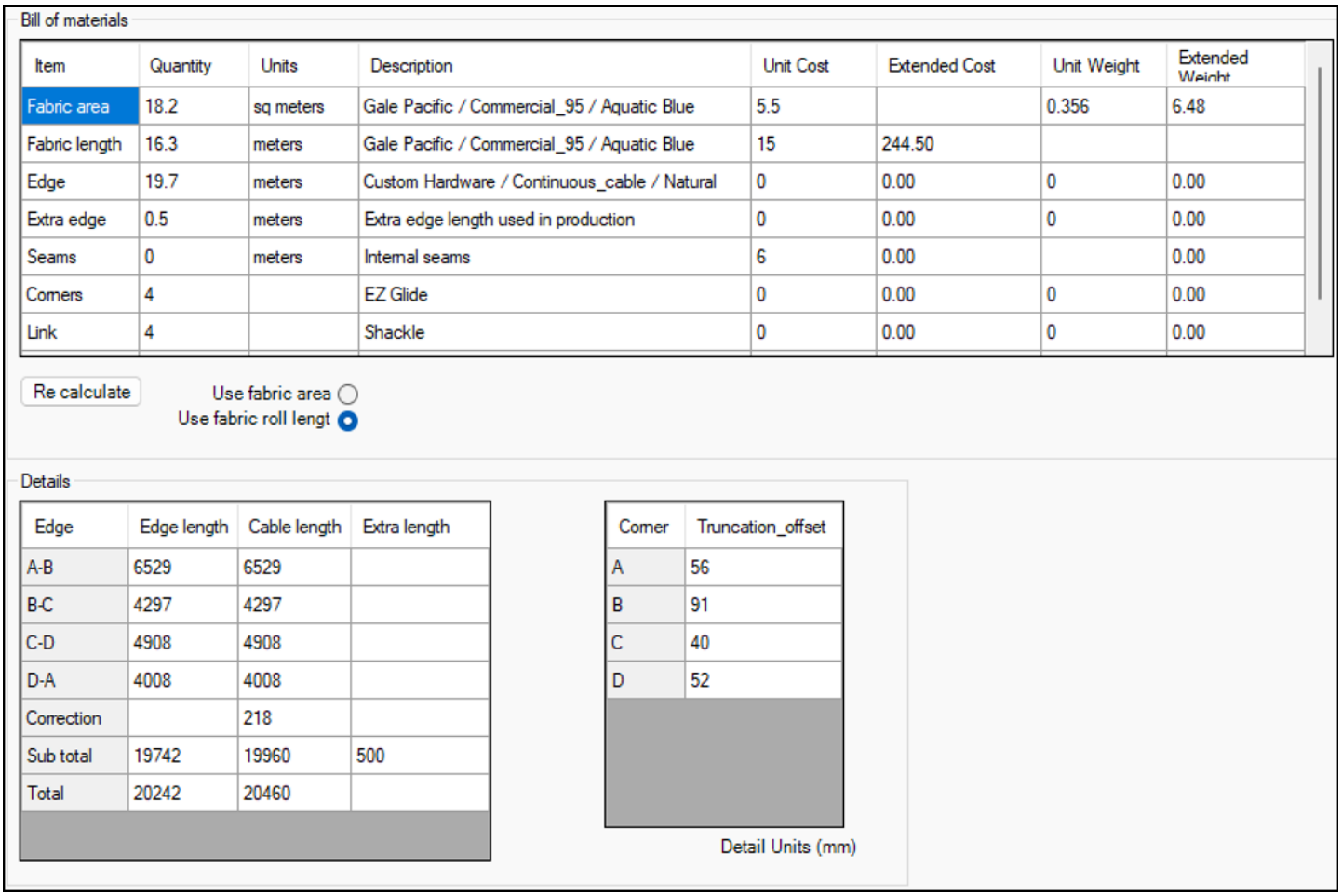


Short Video: Panel nesting operation

Purchase
To purchase the Nesting option please contact support@mpanel.com.

Estimation

On this page a bill of materials is shown, with sufficient information to help with estimating costs.



The main entries are:
Fabric area and description
Fabric roll length and description
Edge length and extra edge length for continuous cables including description.
Corners quantity and description.

If a unit cost was entered in the database, then the extended cost and total cost will have been automatically calculated. Alternately, the unit cost can be entered or modified in this table, and then the Re-calculate button pressed to obtain those figures.

Fabric Notes:

The fabric area is measured on the finished pattern, and includes hems.This is an accurate measurement, but it makes no allowance for wasted fabric.

The fabric roll length is estimated from the pattern dimensions and the specified roll width. No nesting is attempted, so the roll length will usually be an over estimate of the fabric required. If the Nesting Option is purchased then the correct fabric length will be reported.

The internal seam length is also included to allow the seam cost to be added in.

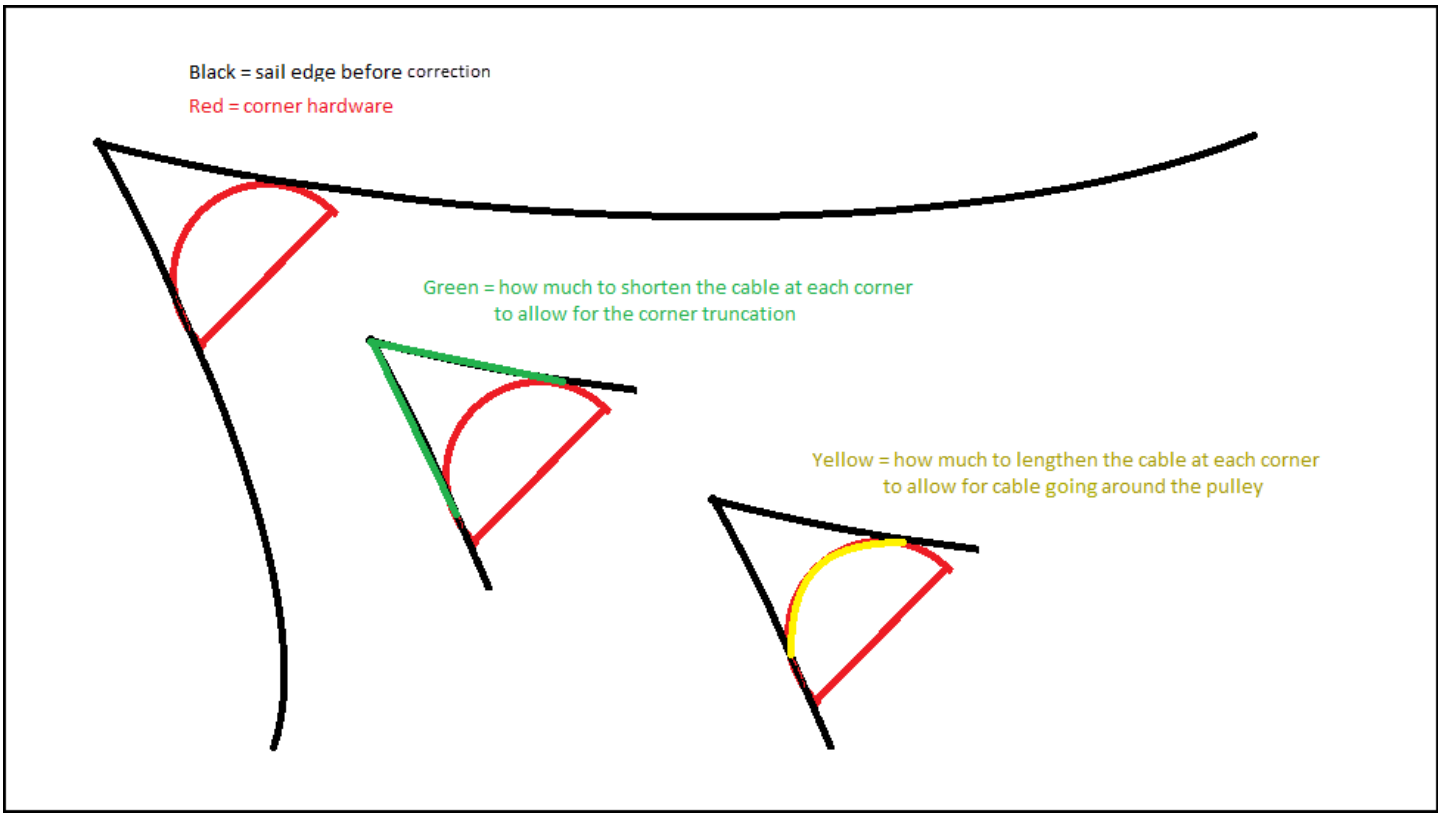
In addition the weight of all components is calculated, this can help with estimating transport costs.

- Edge Detail

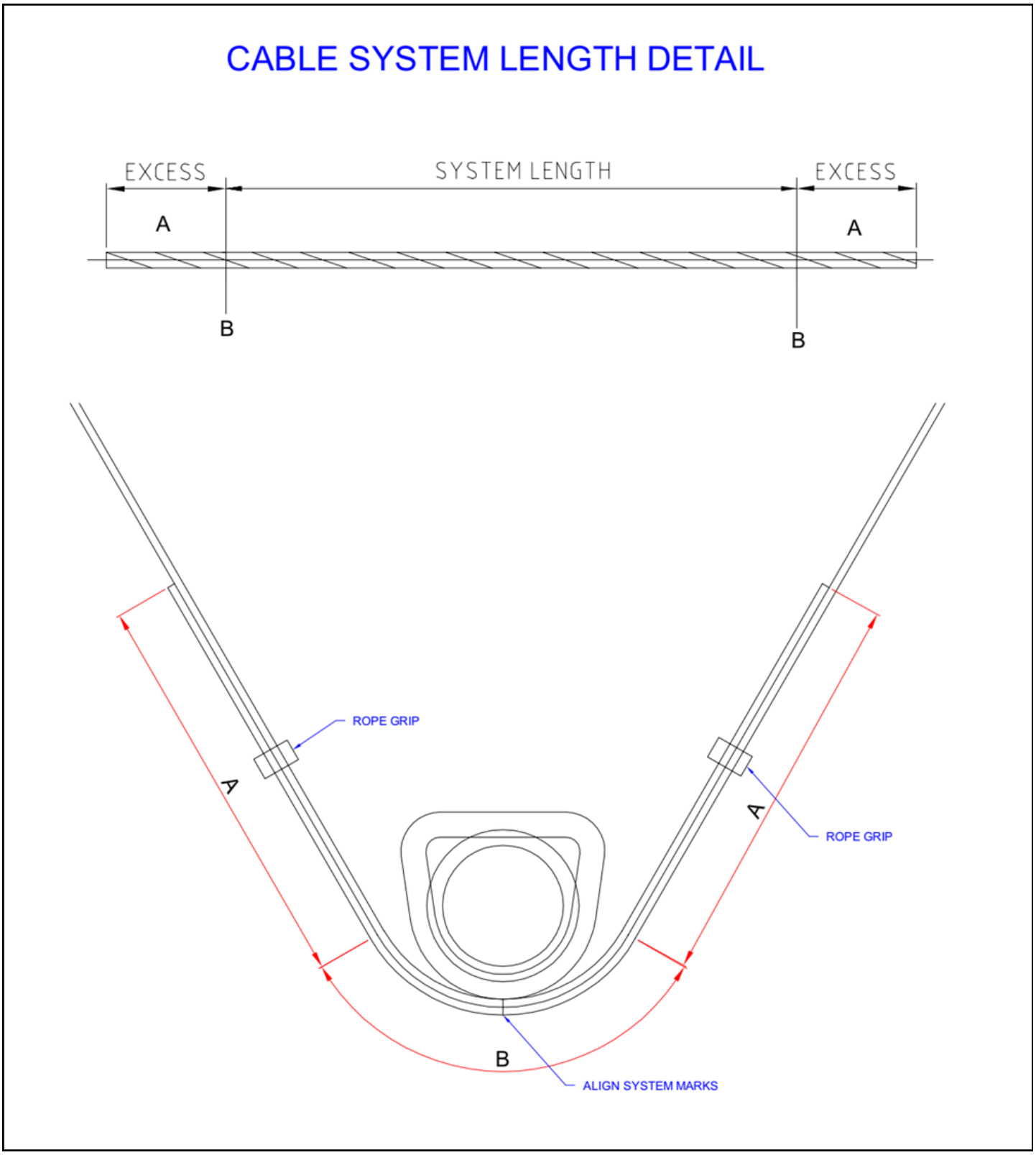
The edge table shows the cable or webbing length on each edge in the "Edge length" column. The total of the edge lengths gives the perimeter length.

If an edge is a Cable edge then the edge length is also reported in the "Cable lengths" column. If the corners have cable going around the hardware, such as EZ Glides, then the amount of cable also needed to go around the

hardware is reported as the "Correction".



If the edge style is continuous cable edge is used for a project then the extra edge length is also reported in the "Extra lengths" column. This shows the amount of extra cable length for overlap...more



The total of the cable lengths and the correction gives the assembled cable length. An additional allowance would be needed on the cable lengths for the swaging overlap which can be added to the continuous cable edge database.

- Corner Detail.

The corner table shows the truncation offset on each corner. This is the measurement from the sail corner after hemming, to the hardware reference point. (center of D ring bar, or center of EzGlide ring). This figure is an aid in locating the corner hardware, when positioning the hardware in the corner to fit, as shown on this page. The offset can then be checked.

(The offset at present is measured on the 3d mesh model, and is not adjusted for the flattening distortions or the

fabric shrink. So on heavily curved models expect a small discrepancy between the estimated and actual offsets)

Reports

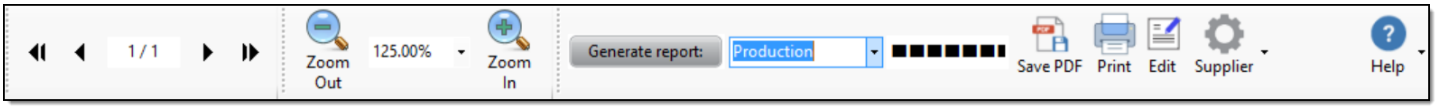
On this TAB the user can preview and print reports that contain a range of information depending on the selected report and report pages. The report generator includes the 2 default reports Production and Visualization, but also allows the user to create new reports and also define which pages will be included in any report.

The reports can be zoomed to fit the page width or the page height to the screen.

The reports can be made into PDF's either individually or all together.

The reports can be printed, either individually or as a set of reports. The printer should be set up first, on the File... Printer setup menu.

Short Video: Report generator

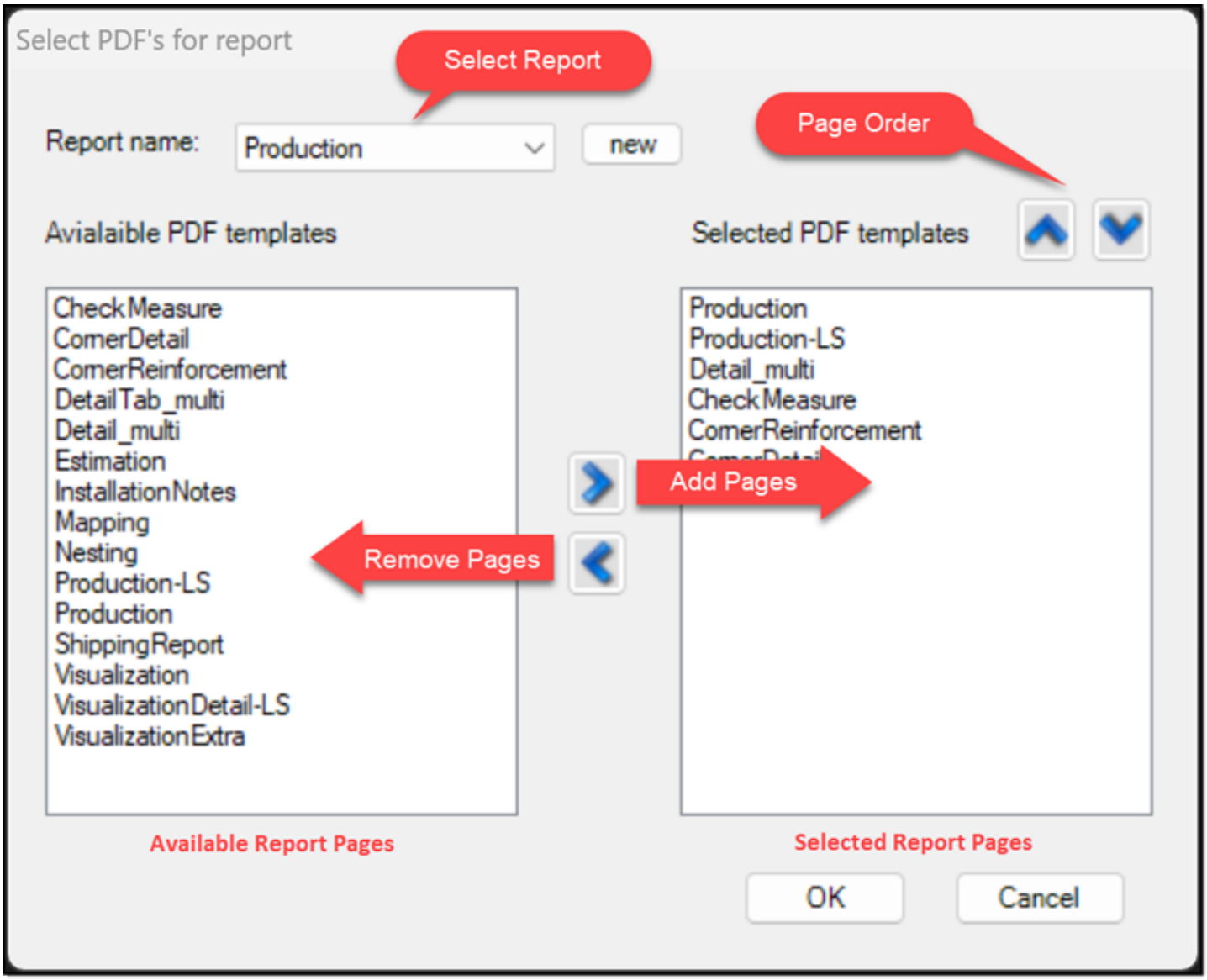


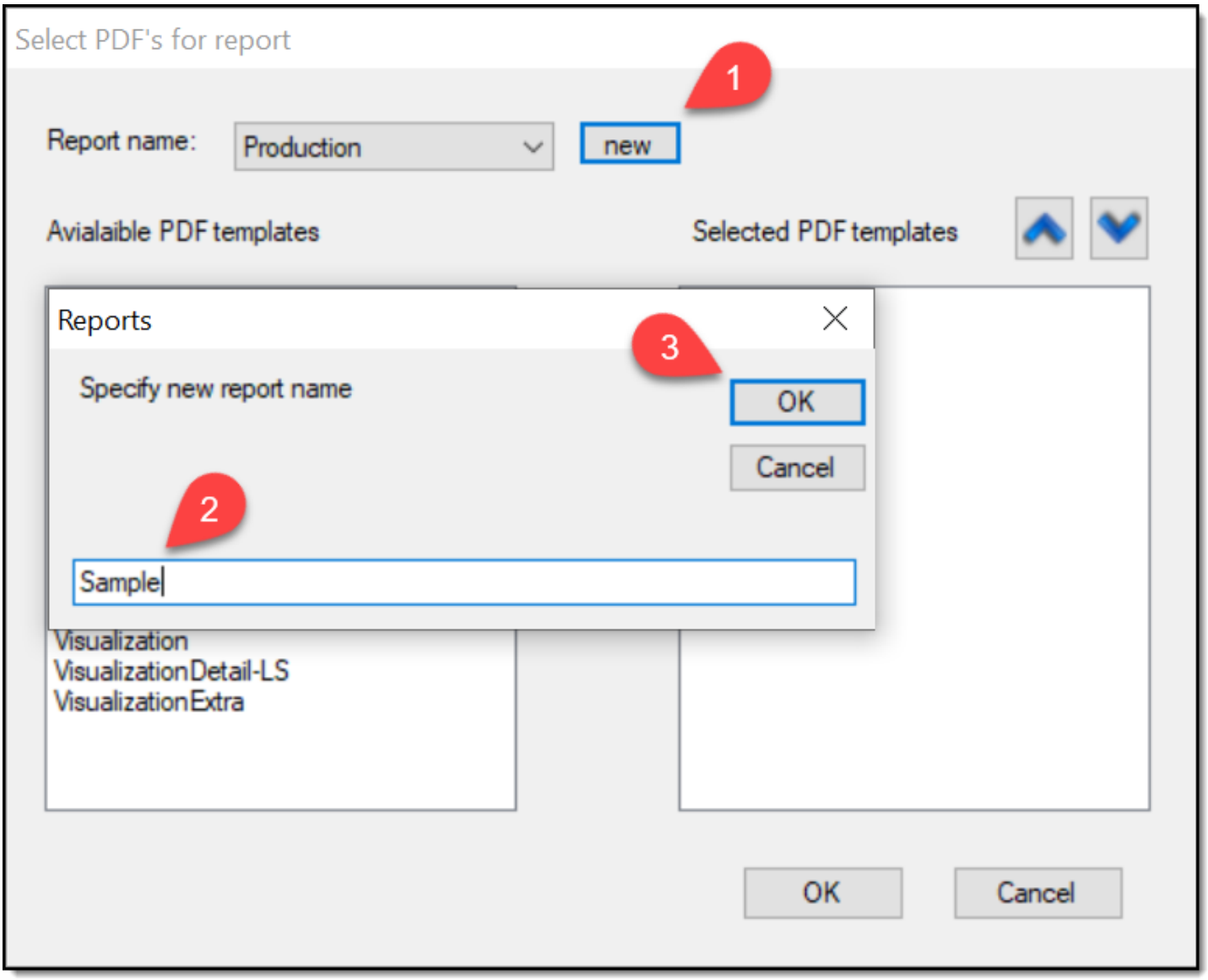
In the toolbar you can click on buttons to (from left to right of toolbar):

- Arrows — select the current report pages
- Zoom — select the zoom level
- Report — select which report to show then "Generate" to produce the report
- PDF — creates a pdf of the report page, or all the report pages
- Print — prints the report, or all the reports
- Edit — edit or create new reports and select which template pages to include in a report
- Supplier — add company name, logo, and additional text used in reports

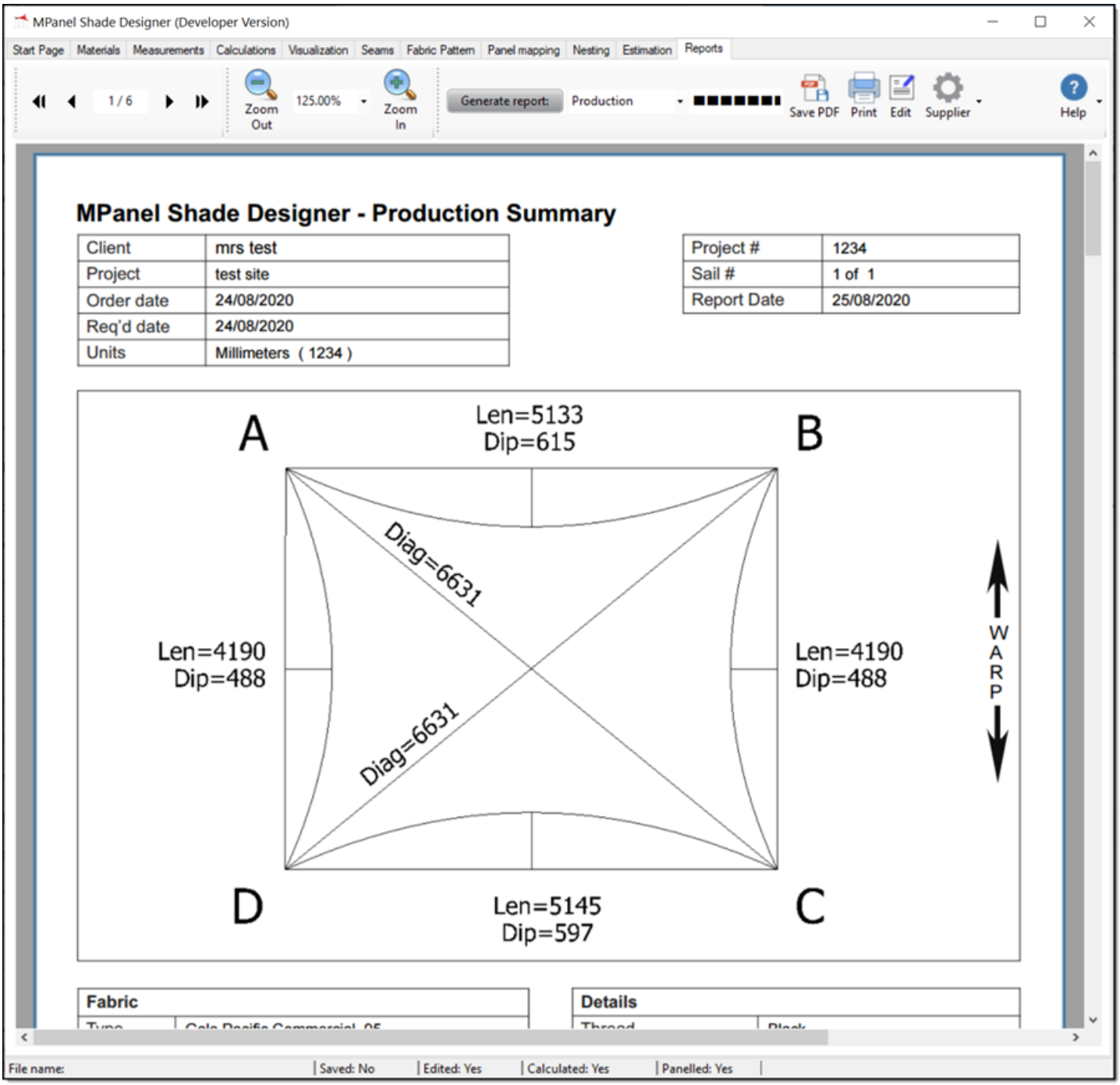
- **Report Editor**

The report editor allows the creation and selection of reports, change which pages are included in a report and the order of pages in the report. Additionally, new custom reports can be added by the user (see image below) and if no longer required, deleted by removing any page templates used in a custom report.


Select PDF's for report
Select Report
Report name:
Production
new
Page Order
Avialaible PDF templates
Selected PDF templates
CheckMeasure
CornerDetail
CornerReinforcement
DetailTab_multi
Detail_multi
Estimation
InstallationNotes
Mapping
Nesting
Production-LS
Production
ShippingReport
Visualization
VisualizationDetail-LS
VisualizationExtra
Production
Production-LS
Detail_multi
CheckMeasure
CornerReinforcement
Add Pages
Remove Pages
Available Report Pages
Selected Report Pages
OK
Cancel



Production reports available



- **Production Page Template (Production)**

This page has all the information needed to produce the shade sail, including Project information, all the panel drawings, edge details, and corner details. At the bottom of the page there is a sign-off strip to be used to record the production progress. A new landscape (LS) version of the page is now available which does not include the sign-off strip.

- **Panel Detail Page Template (Detail_multi)**

This shows a larger copy of the panel cut dimensions drawing, one page will be created for each panel.

- **Panel Detail Tabular Page Template (DetailTab_multi)**

This shows a larger copy of the panel cut dimensions drawing along with tabulated dimensions, one page will be created for each panel.

- **Check Page Template (CheckMeasure)**

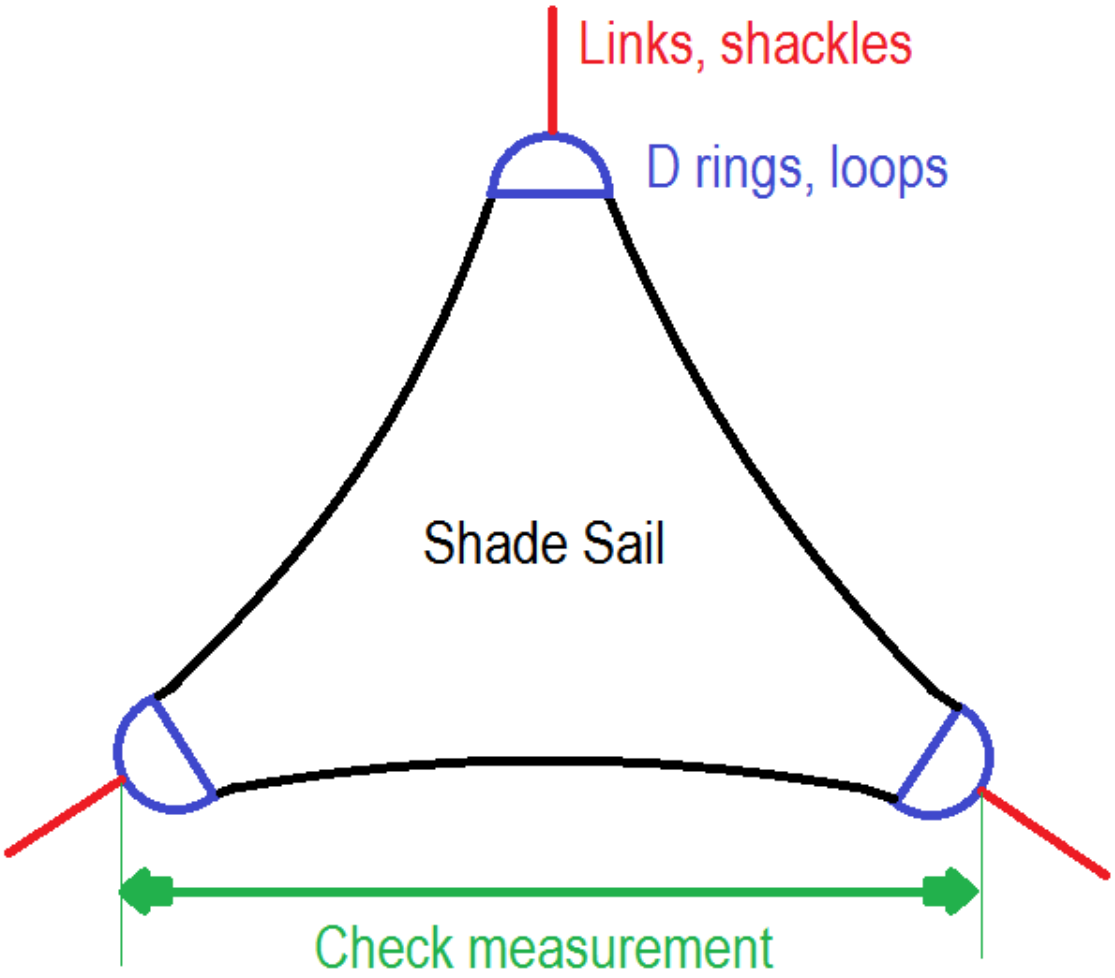
This shows a drawing with the dimensions of the finished sail. This is used for checking the finished sail before shipping and is often shipped to the client with the sail to help them identify the correct sail orientation for installation.

If the sail is made from more than one panel the check dimensions can only be approximate, as the real dimensions depend on how the shaped sail flattens out when laid on the floor. Also the exact placing of the hardware in the corners will change the finished measurement. But even so, the finished sail dimensions offer a good check that the sail will fit when sent to the job site.

The check measurements are made to the points where the corner hardware (D ring, loop, etc) would attach to any corner link (shackle, turnbuckle) or corner fixing.

In addition the original site dimensions are included.

This drawing shows the check measurement points on a triangular sail with D rings.



- **Panel Nest Page Template (Nesting)**

This shows the nest results (Nesting option required) which can be printed for production control - note the panel numbers are printed at the bottom of the panels.

In addition, the report provides a summary of the nest including the amount of fabric required (length) and the fabric utilization expressed as a percentage of the cut roll length.

Number of panels	4
Number of nested panels	4
Nested length	7084
Fabric utilization	65.6%

- **Panel Mapping Page Template (Mapping)**

This page is available when the number of seams is set to one or "Allow multiple panel maps" option is checked. It shows the number and length of fabric strips required and then an assembly drawing showing how they should be joined together to form a single fabric panel. The sail pattern can then be drawn onto the fabric panel and then cutout.

In addition, the report page provides corner offset values which are the start points for the sail pattern to be built from.

- **Corner Detail Page Template (CornerDetail)**

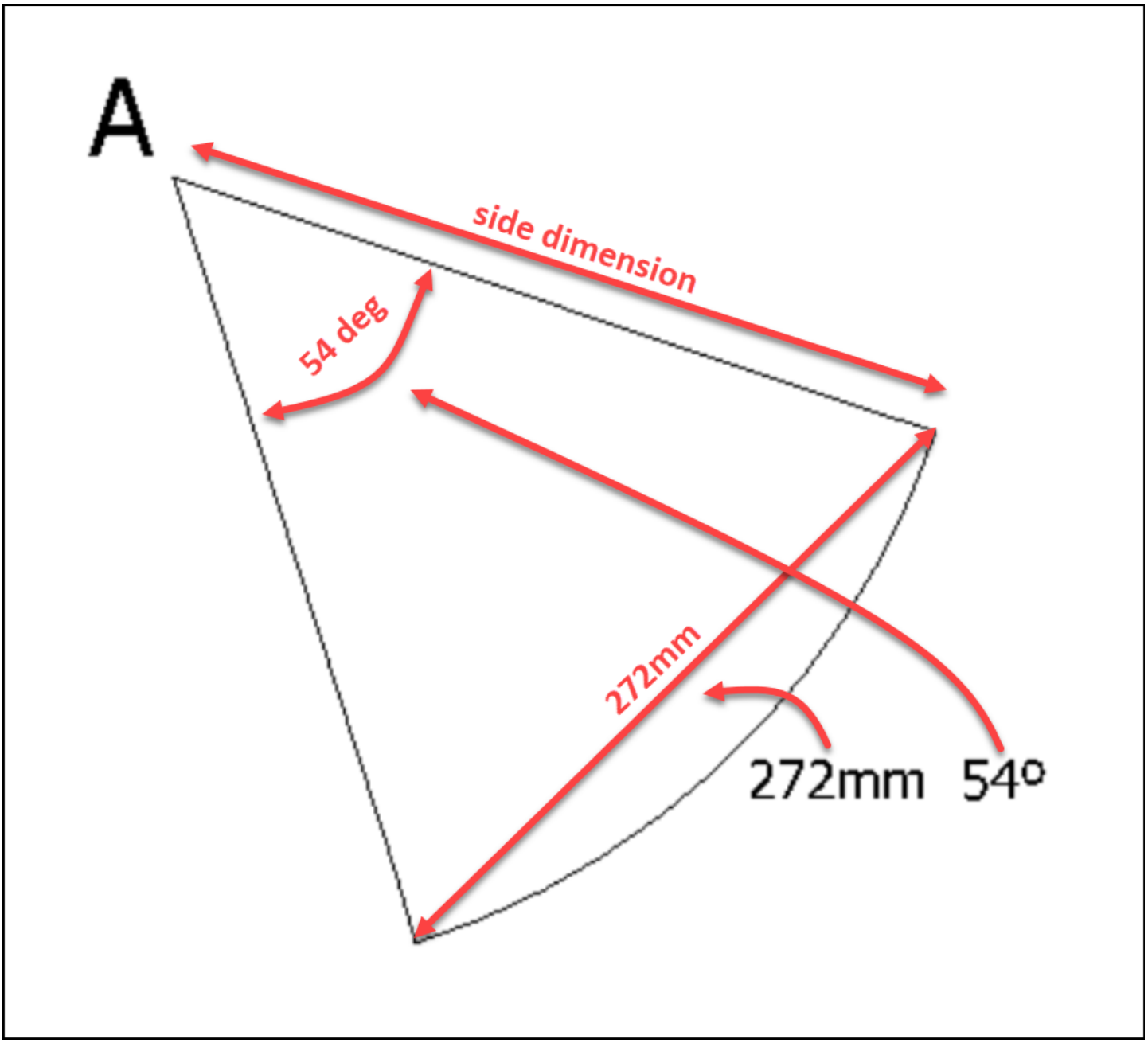
This shows the sail with the corners exaggerated in size to show the details of how the corner hardware (D ring or Ez glide pulley) is positioned in the corner. This helps to make the corner truncation value more understandable.

In addition a black and white copy of the example corner image is included, which can help the production staff. If there are no corners with D rings or pulleys and no example corner image this report is not generated.

- **Reinforcement Patch Page Template (CornerReinforcement)**

This shows the sail reinforcement patches exaggerated in size to show the dimensions clearly.

The dimensions provided are explained below:



- **Estimation Page Template (Estimation)**

This provides the information from the Estimation page in a report format, that can be sent to PDF or printed as required.

- **Installation Notes Page Template (InstallationNotes)**

This page will include the contents of a txt file you create and save in the MPanel Shade Designer directory in documents so you can customize information you send to your client with the sail.

- **Shipping Report Page Template (ShippingReport)**

This page shows the finished sail size along with additional information to assist your client to identify which hardware to fit in each sail corner.

In addition, it will show any text in "Additional Text.txt" file you create and save in the MPanel Shade Designer directory in documents so you can customize information you send to your client with the sail.

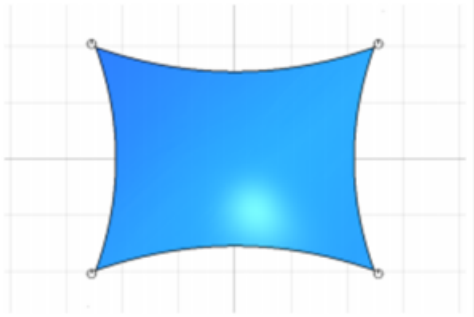
Visualization reports available

MPanel Shade Designer - Visualization

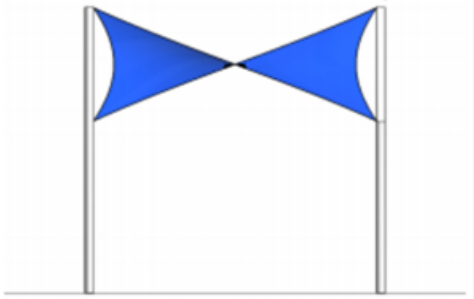
Client	
Project	
Project #	
Order Date	27/08/2020
Req'd date	27/08/2020
Units	Millimeters (1234)
Sail #	1 of 1
Report date	27/08/2020

Supplier	MPanel Shade Designer

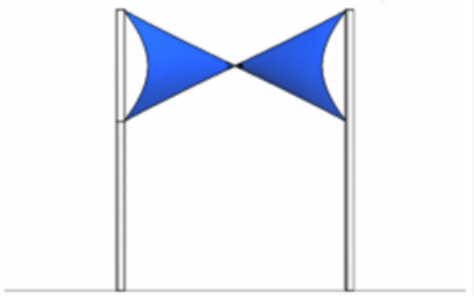
Top View



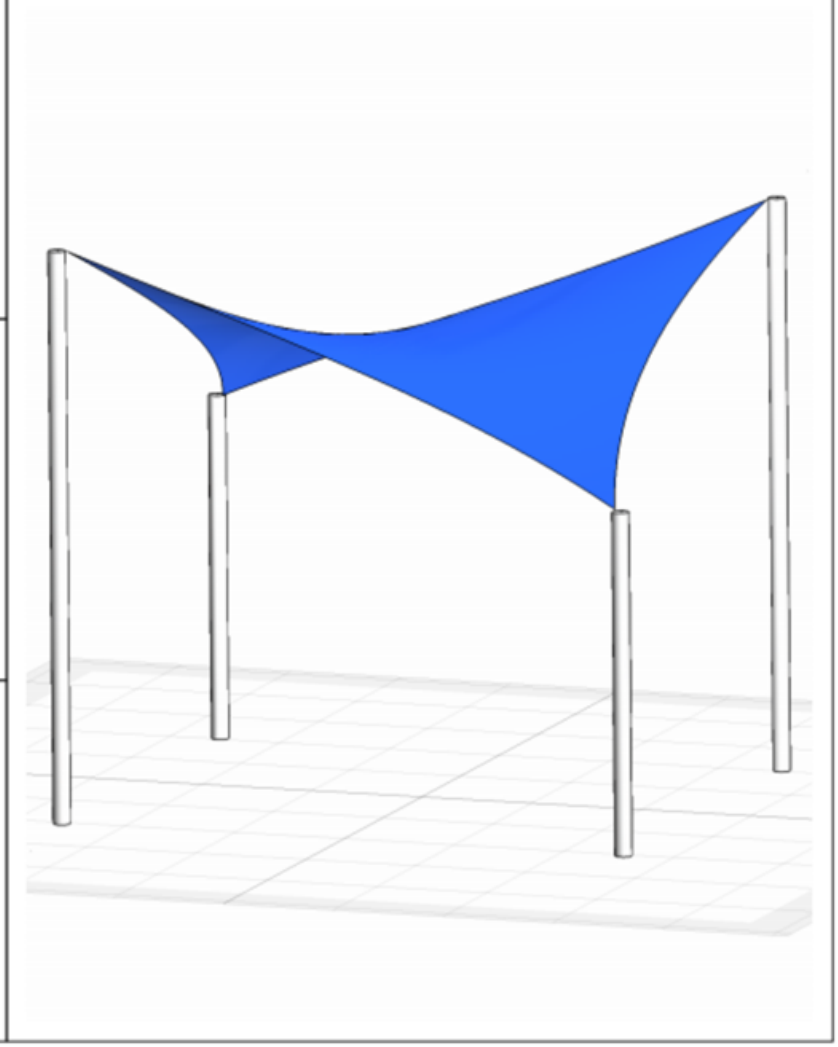
Front View



Right View



Model View



Area sq meters	Site 20.0	Sail 14.9
Fabric type	Gale Pacific Commercial_95	
Fabric color	Aquatic Blue	

Edge length	19.9	meters
Edge style	Webbing	
Edge color	Natural	

Project approval / Client acceptance

Signature _____ Date _____

- **Visualization Report Page Template (Visualization)**

Here you can preview a visualization report that shows the sail in perspective, top, right, and left views, along with information such as the sail area and edge length. The projected area is reported as both sail (the actual area of the sail with catenary curves deducted) and site area which is the area between poles.

- **Visualization Extra Report Page Template (VisualizationExtra)**

This report is an extension to the base report and provides additional details about the sail. Additional notes such as supply terms etc. can be included in the report by adding a text file under the Supplier settings.

- **Visualization Report Page Template (VisualizationDetail-LS)**

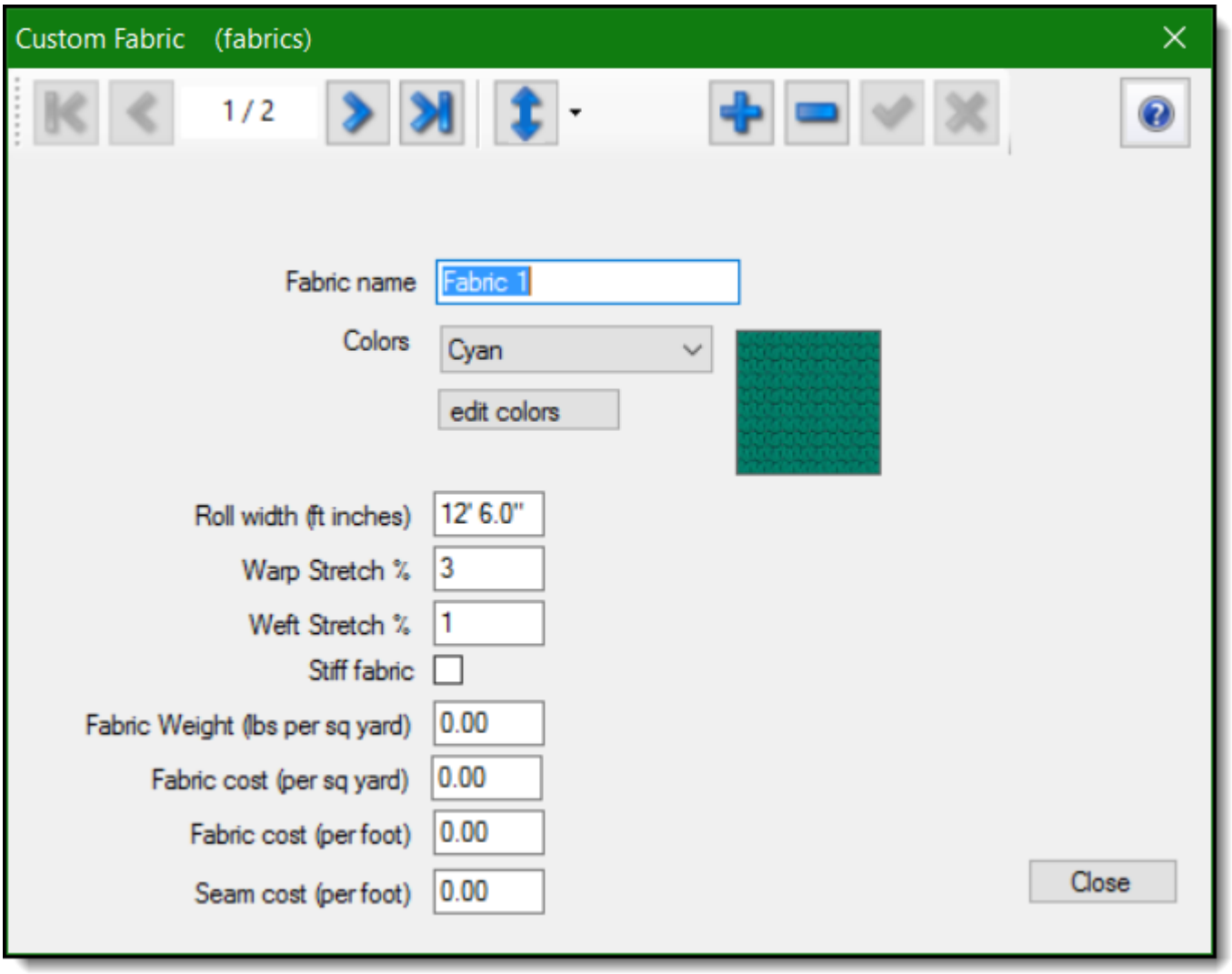
Here you can preview a larger visualization report in landscape that shows the sail in perspective, top, right, and left views.

Fabric Database

The custom fabric database is usually edited to add or change data for fabrics that are not included in the manufacturers databases.

The manufacturers databases are usually edited to specify the fabric and seam costs. These values are preserved even when a manufacturers database is updated.

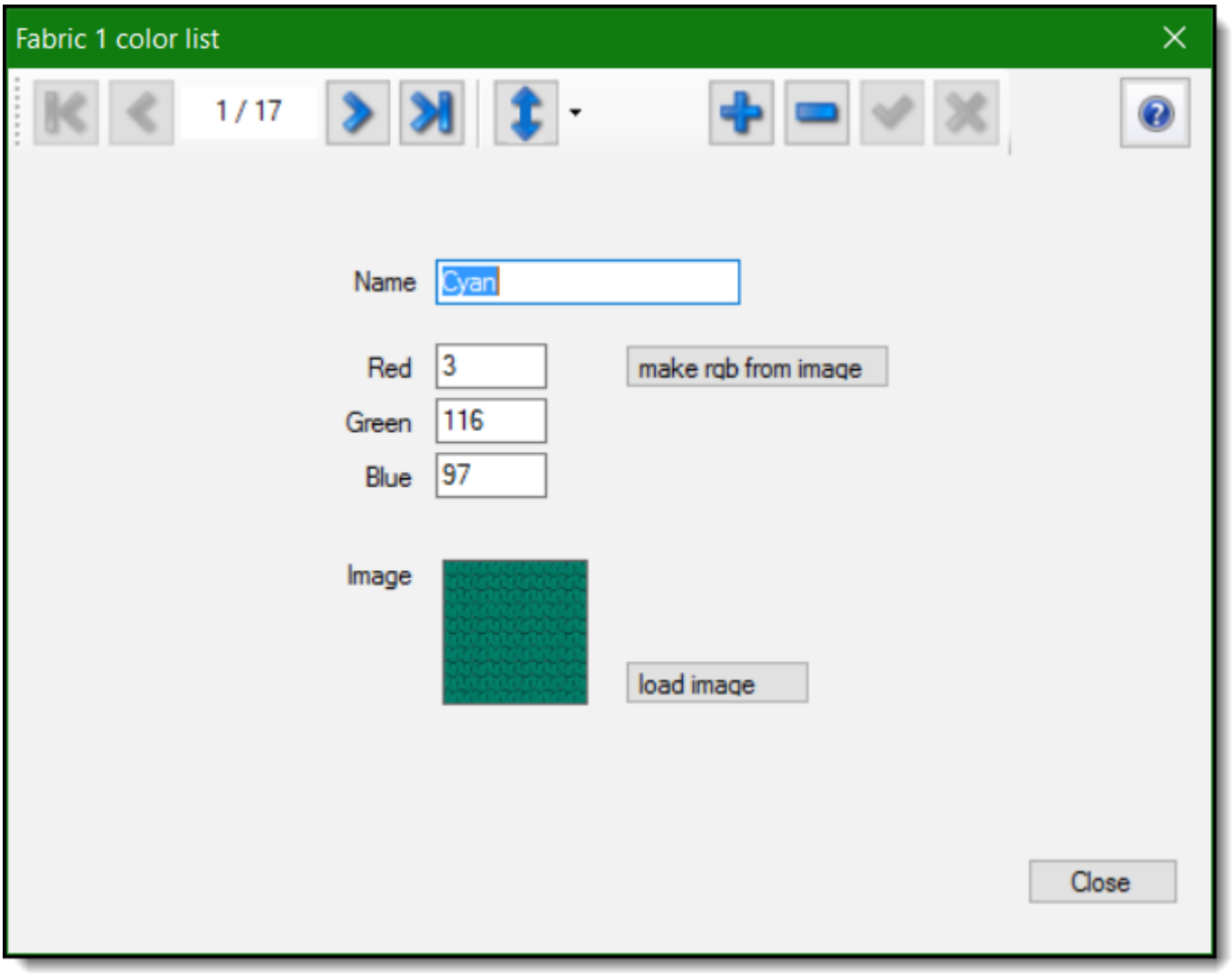
The other information in a manufactures database can also be edited, but it will be overwritten if the database is updated.



The fabric databases have these entries for each fabric type:

```
Fabric Name              the name you use for the fabric
Colors                   a list of colors that are available for this fabric, with color
names and fabric swatch images
Roll width               the roll width, in the selected units system
Warp stretch %           the warp stretch recommended by the fabric manufacturer for an
installed shade sail.
Weft stretch %           the weft stretch recommended by the fabric manufacturer for an
installed shade sail.
Stiff fabric     informs the program that a stiff fabric (not an HDPE knitted shade
cloth) is being used
Fabric weight     the weight per era of the fabric, used on the estimations page.
Cost per area            the cost of the fabric, in square meters or square yards.
Cost per roll length     the cost of the fabric by used roll length, in meters or feet.
Cost per seam length     the cost of making an internal seam with this fabric, used on
the estimations page.
```

The color swatches in the database can be edited as well, by using the "edit colors" button.

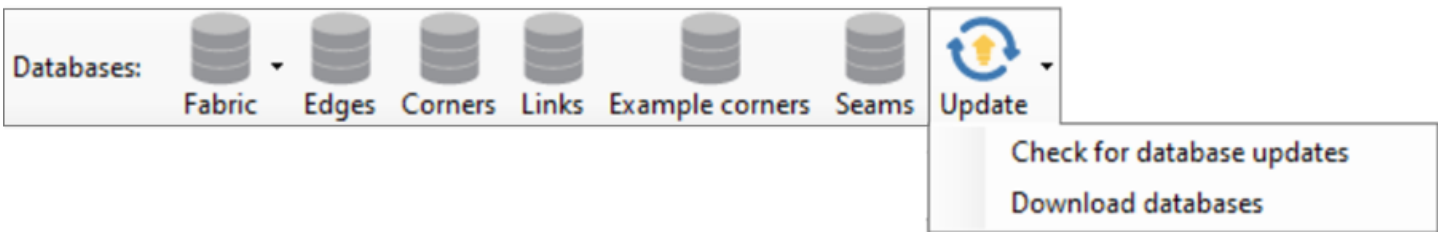


The color database is usually edited on custom fabrics to specify the choices.

The usual method is to obtain a color swatch image, and select it with the "select image" button. The image size should be below 50kb to maintain database speed. The Red, Green and Blue components of the color swatch can be obtained with the "make RGB from image" button.

If a color swatch is not available, RGB values can be entered by hand, in the range 0 to 255

Database updates

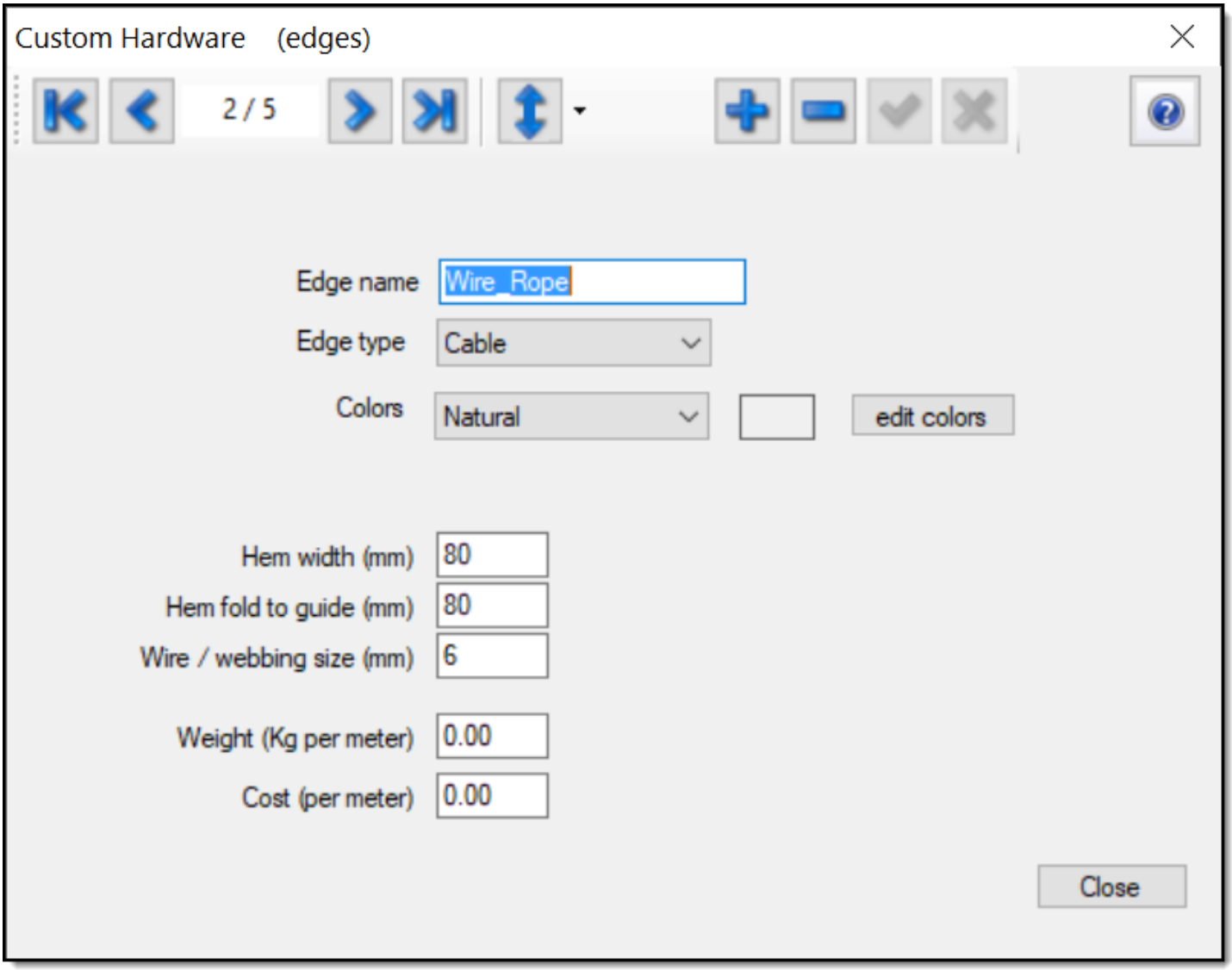


The manufacturers databases can be checked to see if there are up to date using the "Check for database updates" menu item. The databases are also checked on each program start, and a warning message given if any databases are out of date.

The databases can be updated, or new databases installed, using the "Download now databases" menu item. During an update the information for fabric costs and seam costs is preserved.

Hardware Database (edges)

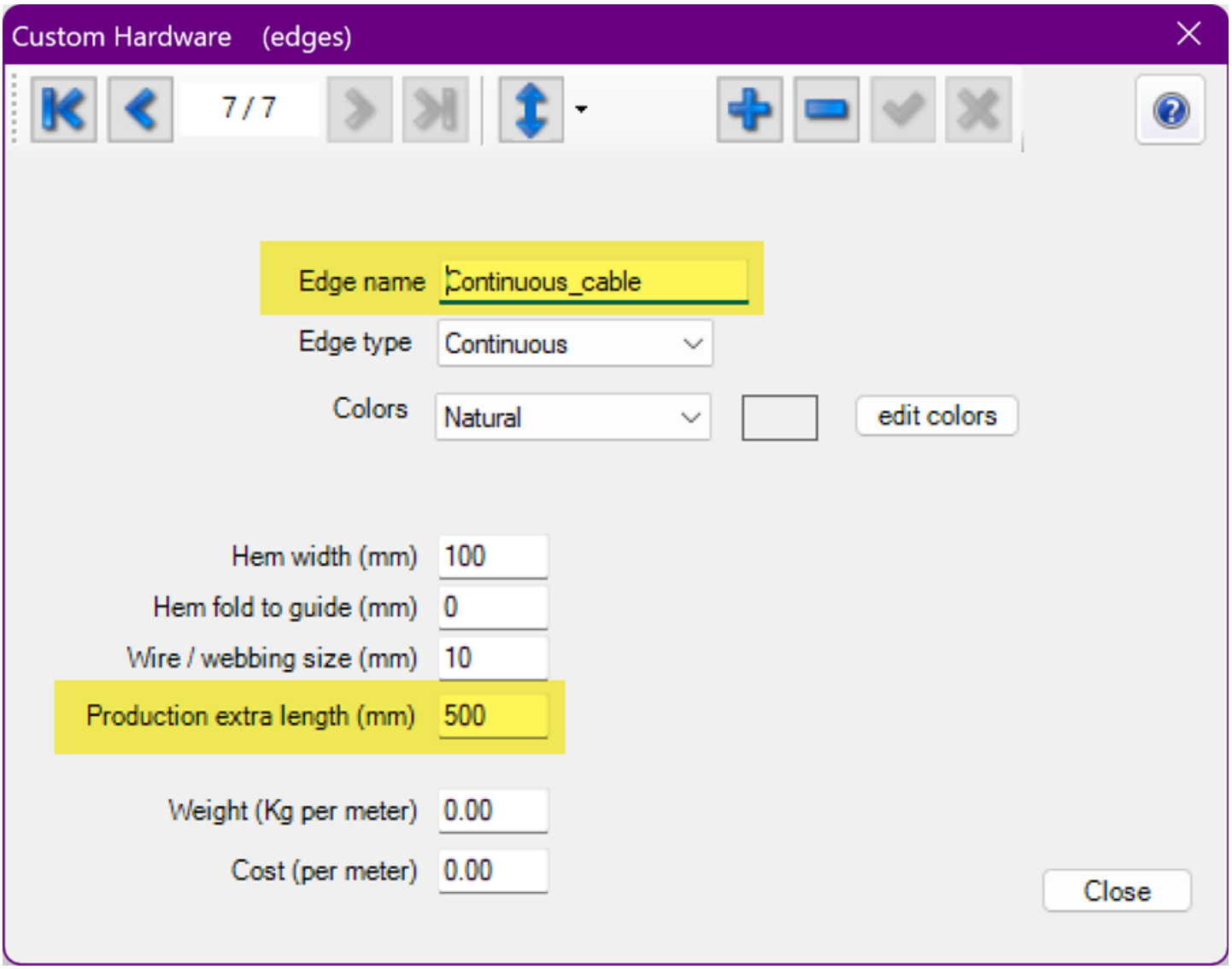
The hardware database (edges) is edited and added to describe the sail edges that are used in your fabrication.



The database has these entries for each edge type:

```
Edge name          the name you use for the edge
Edge type          edges can be Webbing, Cable or Straight
Color/Material     webbing color or cable material. Often color is "Natural"
Hem width          the width of fabric to turn over to make the sail edge, or the cable
pocket
Hem fold to guide  provides a guideline to fold the hem edge to. The distance is inward
from the finished sail
                   edge so if set to 0 the guide will be the finished sail edge/hem fold
line.
Size               the cable diameter, or webbing width. Used for description only.
Cost               the cost of the edge, in meters or feet.  (optional)
```

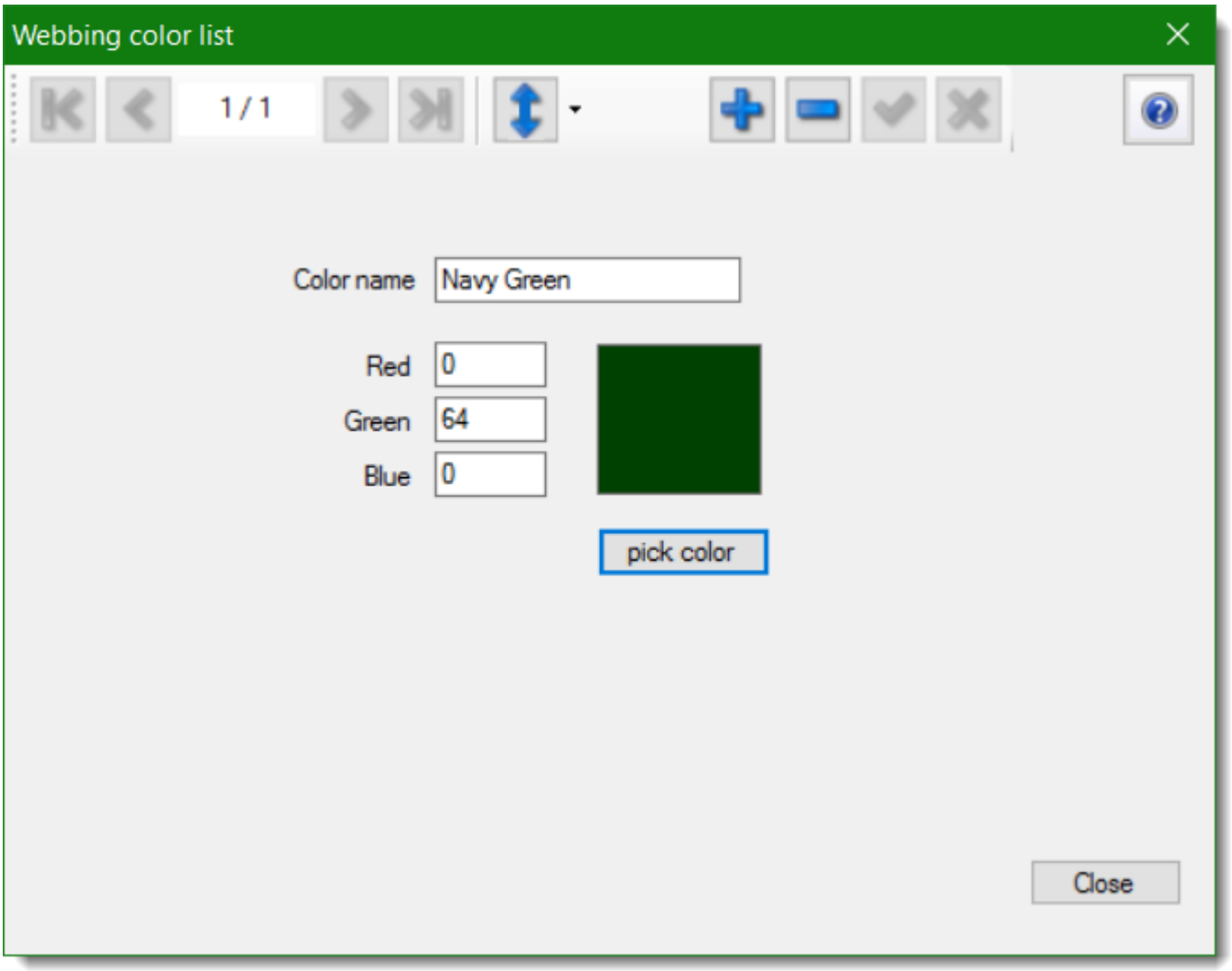
Continuous cable edge type:



Introduced in V16, this edge option should be used when a single continuous cable edge is used in conjunction with slip-ring corners (such as ezy-slides). This edge style includes a field for Production extra cable length. This will be added to the calculated cable length to allow for any extra cable you choose to allow for cable overlap. For example, if the calculated length of a continuous cable is 20ft and you add 3ft of extra length, the production and estimation reports will show both the calculated, extra and total cable length to ensure production staff cut the correct cable length.

When selected, this edge option will automatically check the same cable tension box:

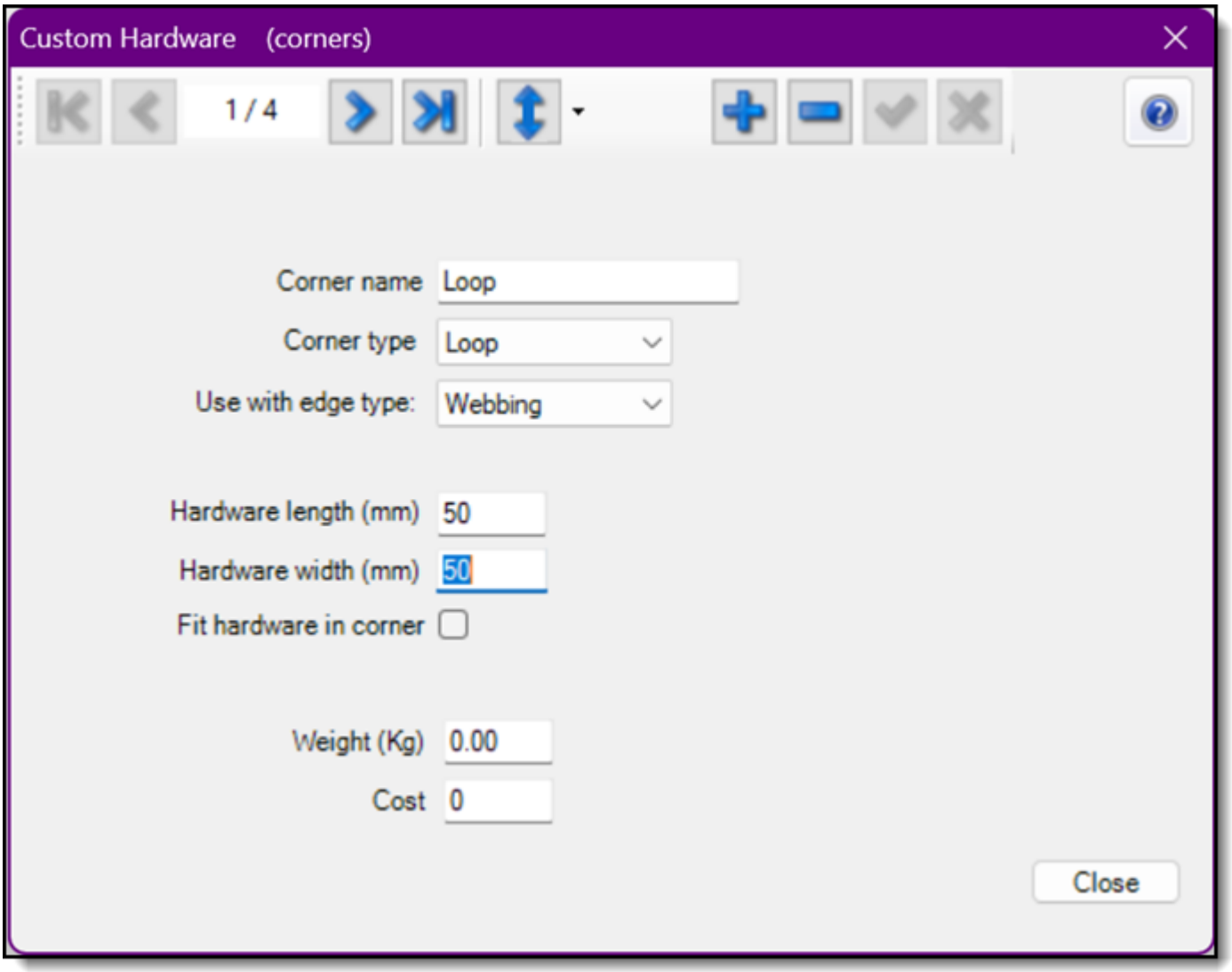
The colors in the database can be edited as well, by using the "edit colors" button. This is usually done when colored webbing is available.



The usual method is to select a color from the color picker using the "select color" button. Alternatively the RGB values can be entered by hand, in the range 0 to 255

Hardware Database (corners)

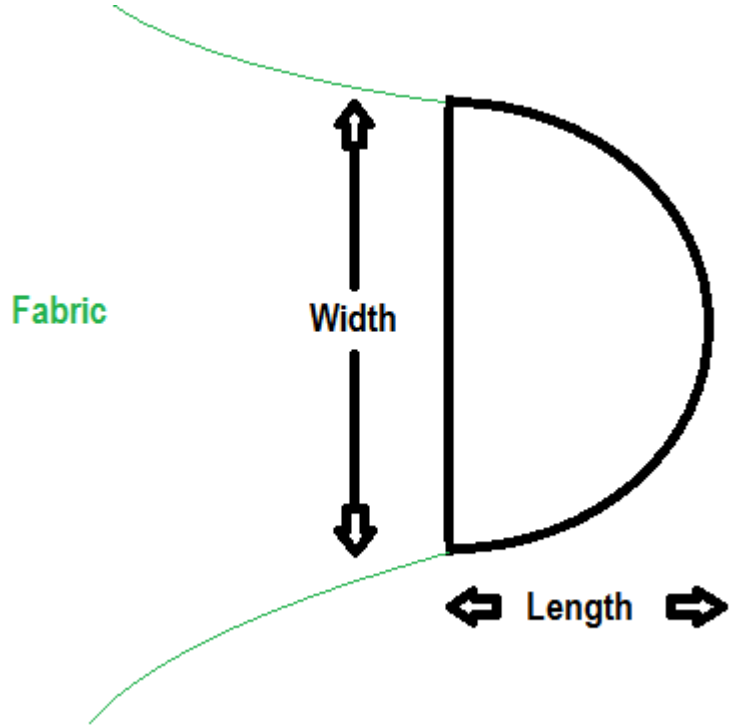
The hardware database (corners) is edited and added to describe the corner constructions that are used in your fabrication.



The custom hardware database (corners) has these entries for each edge type:

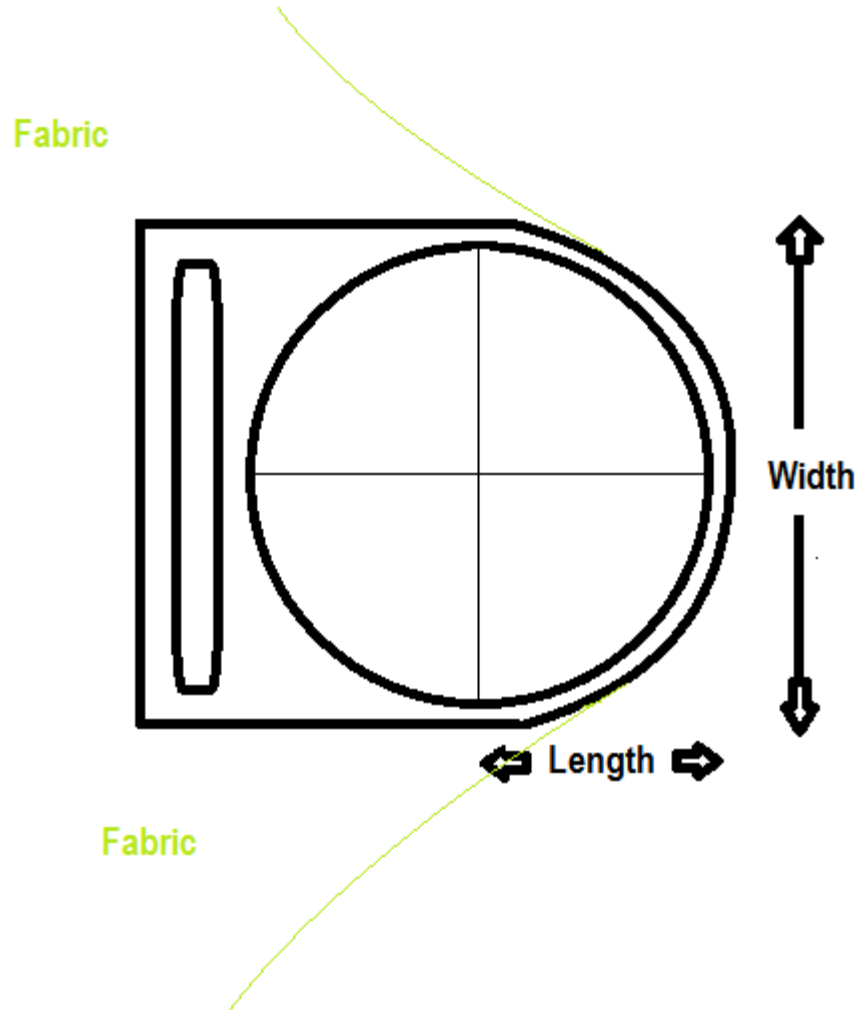
Corner name	the name you use for the fabric
Corner type	can be Loop, Ring, Pulley or Other, used to select example corner images
Use with	corner can be used with Webbing, Cable or Straight edges
Hardware width	the effective width of the hardware (see below)
Hardware length	the effective length of the hardware (see below)
Fit hardware circle in corner	how the hardware is fitted in the corner (see below)
Weight	weight of the corner, used in estimations
Cost	the cost of the corner.

D ring example



Width = base of the D ring
Length = internal length from center of front curve to base
Fit hardware circle in corner = No (because the D ring will be fitted with the base on the truncated corner of the sail.

EZ Glide example



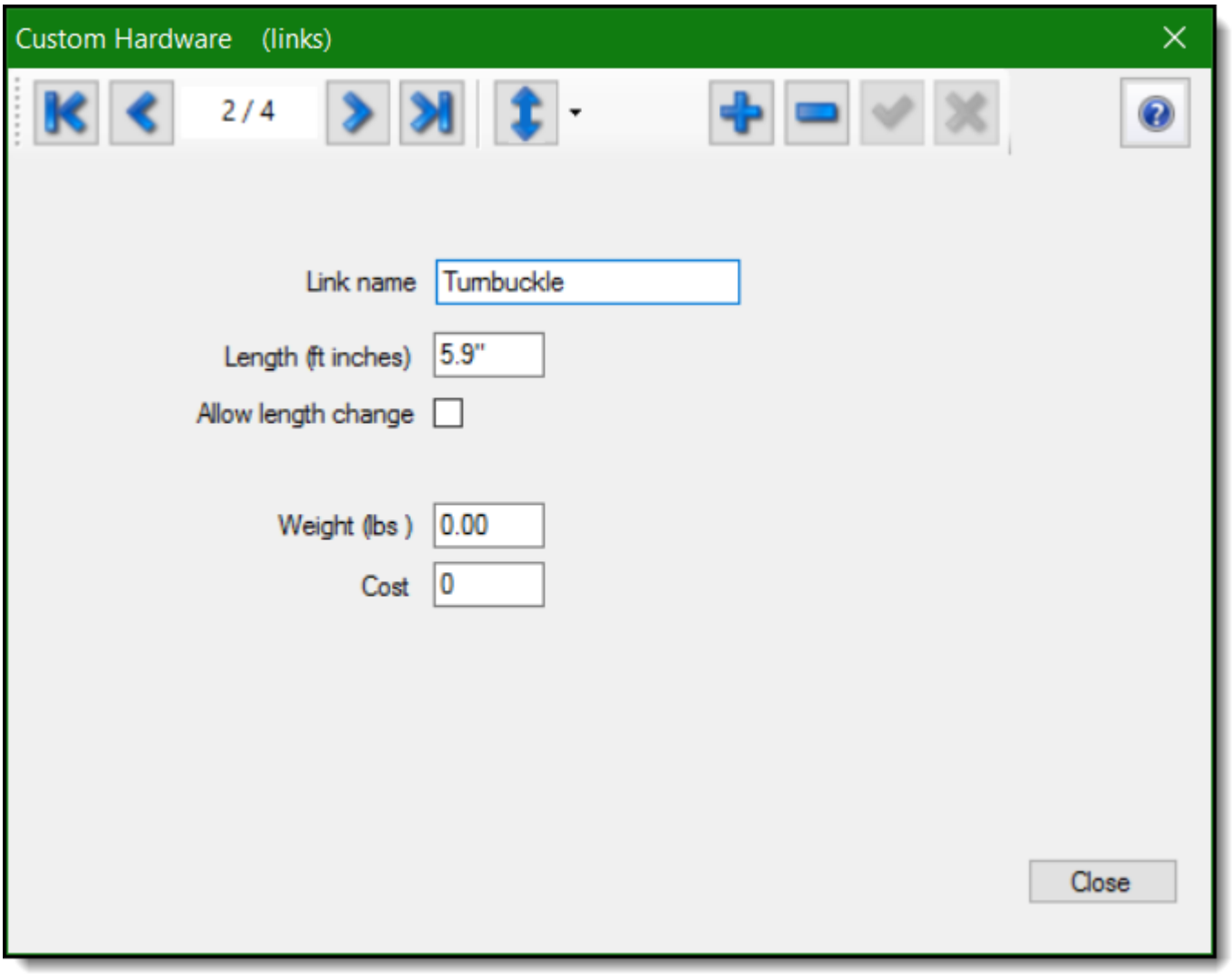
Width = diameter of the path that cable will lie in, approximately diameter of hardware circle
Length = internal length from center of front curve to middle of circle, approximately radius of hardware circle
Fit hardware circle in corner = Yes (because the EZ Glide will be fitted with the circle tangential to the sail edge at the corner)

Ring example

In this example we have no width as the distance between the cables at the ring is determined by the angle of the sail corner. The convergence point for the 2 cables will be the center of the ring as a work-around, we use the following:
Width = zero
Length = Radius of the ring (diameter/2)
Fit hardware circle in corner = No
Edge cable length information provided in reports should be hand corrected by subtracting the ring diameter (ring R for each end of the cable with this termination detail)

Hardware Database (links)

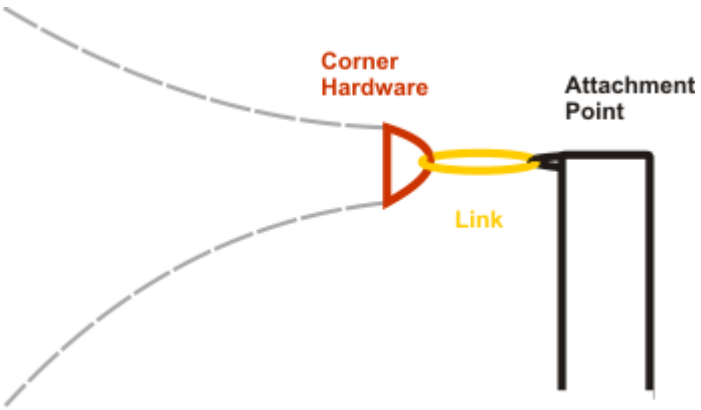
The hardware database (links) is edited and added to describe the links between the corner hardware and the pole attachment lug.




```
Link name                   the name you use for the link
Link length                 the length of the link (this is the internal length of a
shackle, for example)
Allow length change         usually only used for guy wires.
Weight                      weight of the link, used in estimations
Cost                        the cost of the link.
```

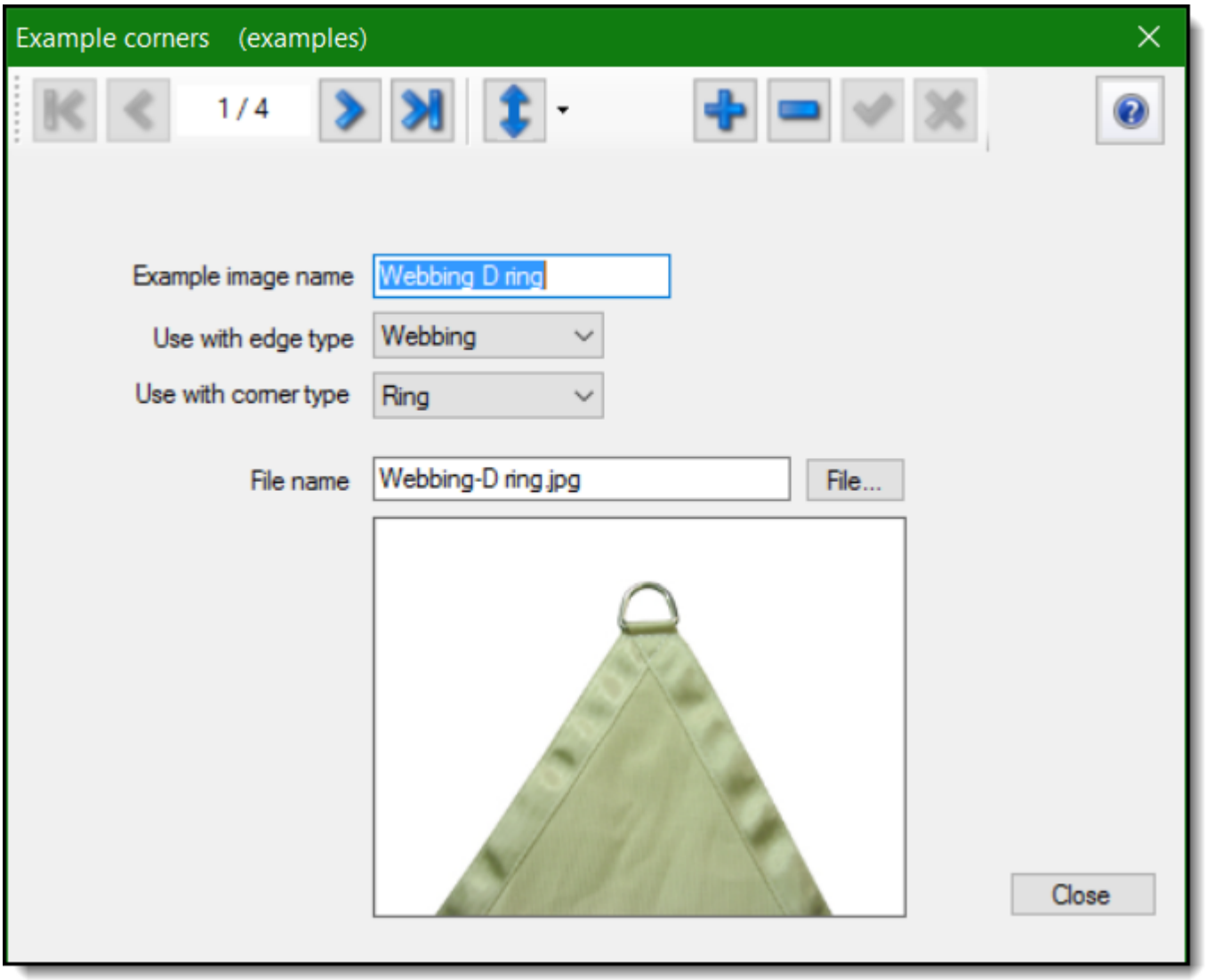
There is also a tick box which will allow you to change the link length during the design. This is usually only ticked for guys.

The picture below shows where the link is specified.



Example corners database

The example corners database has example images of corner construction, which can be used to help in production and customer visualisations.



The example images can be replaced by images of your construction details.

The replacement images will usually be digital photographs, in a 4:3 format, stored as jpgs in the images folder. For program speed is best to keep the image size below 200kb
The images folder is located in your documents folder in a place like:

C:\Users\User_Name\Documents\MPanel Shade Designer\Images or C:\ProgramData\MPanel Shade Designer\images or any location that you may save custom images to.

The images can be set in the database to be used with :

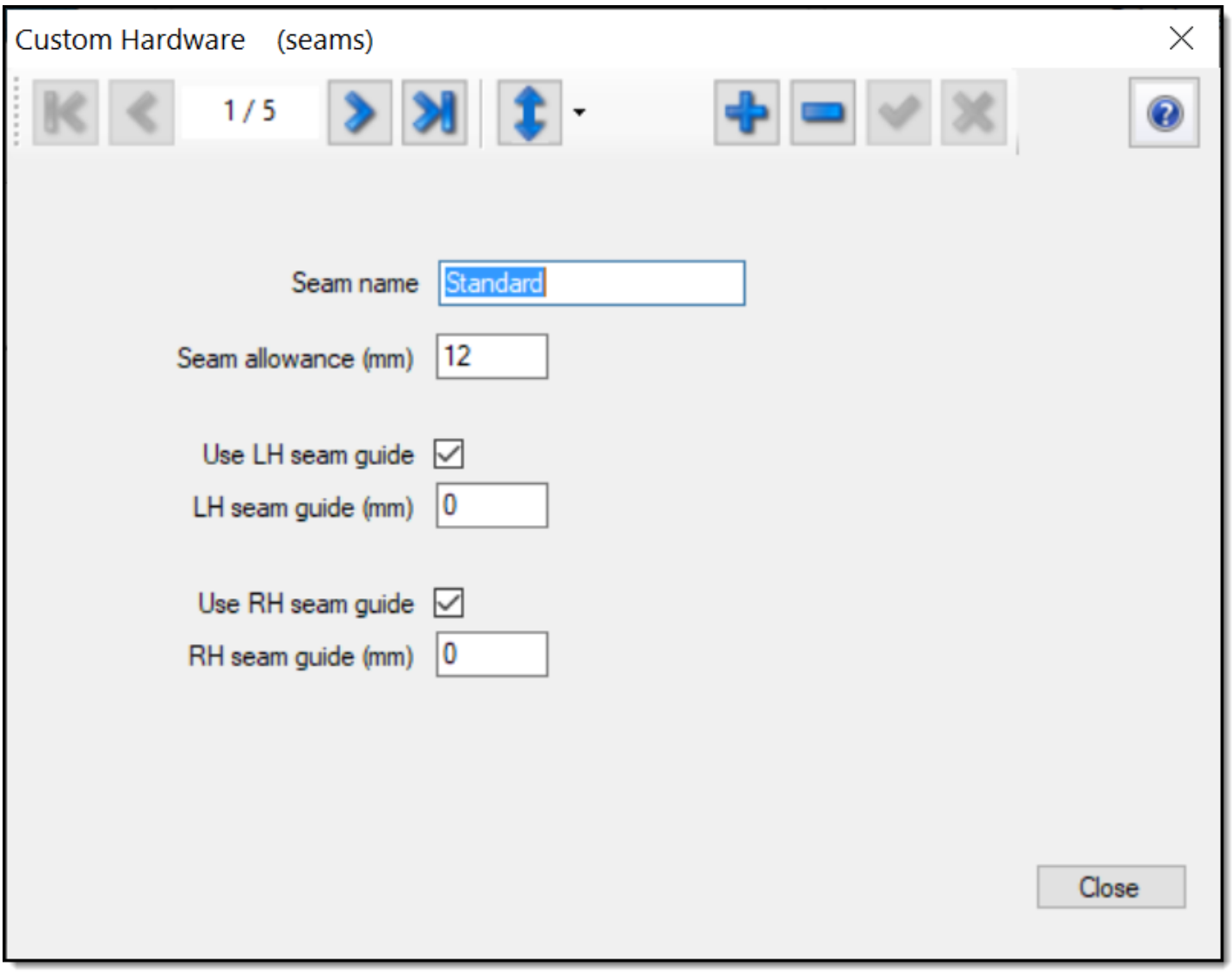
```
Edges
     Any
     Webbing
     Cable
     Straight
     Continuous

Corners
     Any
```

```
Loop
Ring                (D rings, round rings, triangular rings)
Pulley              (Ez Glides, hardware that the cable passes though)
Other
```

All the images in the database that match the edge and corner selections will be available in the "Example Images" drop down on the measurements page.

Seam database

The seams database (introduced in v12) is edited and added to describe the seam edges and guides that are used in your fabrication.



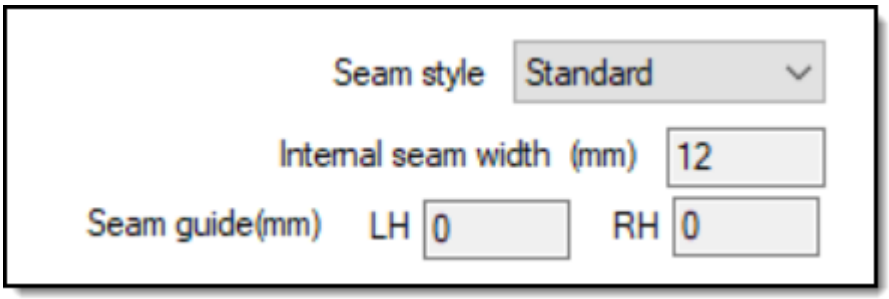
The database has these entries for each seam type:

```
Seam name          the name you use for the seam
Seam allowance     the amount that will be added to both edges of the seam
Seam guide         check to include a guide on the left or right of each panel
Seam guide         distance inward from seam centreline that the guideline will be added
```

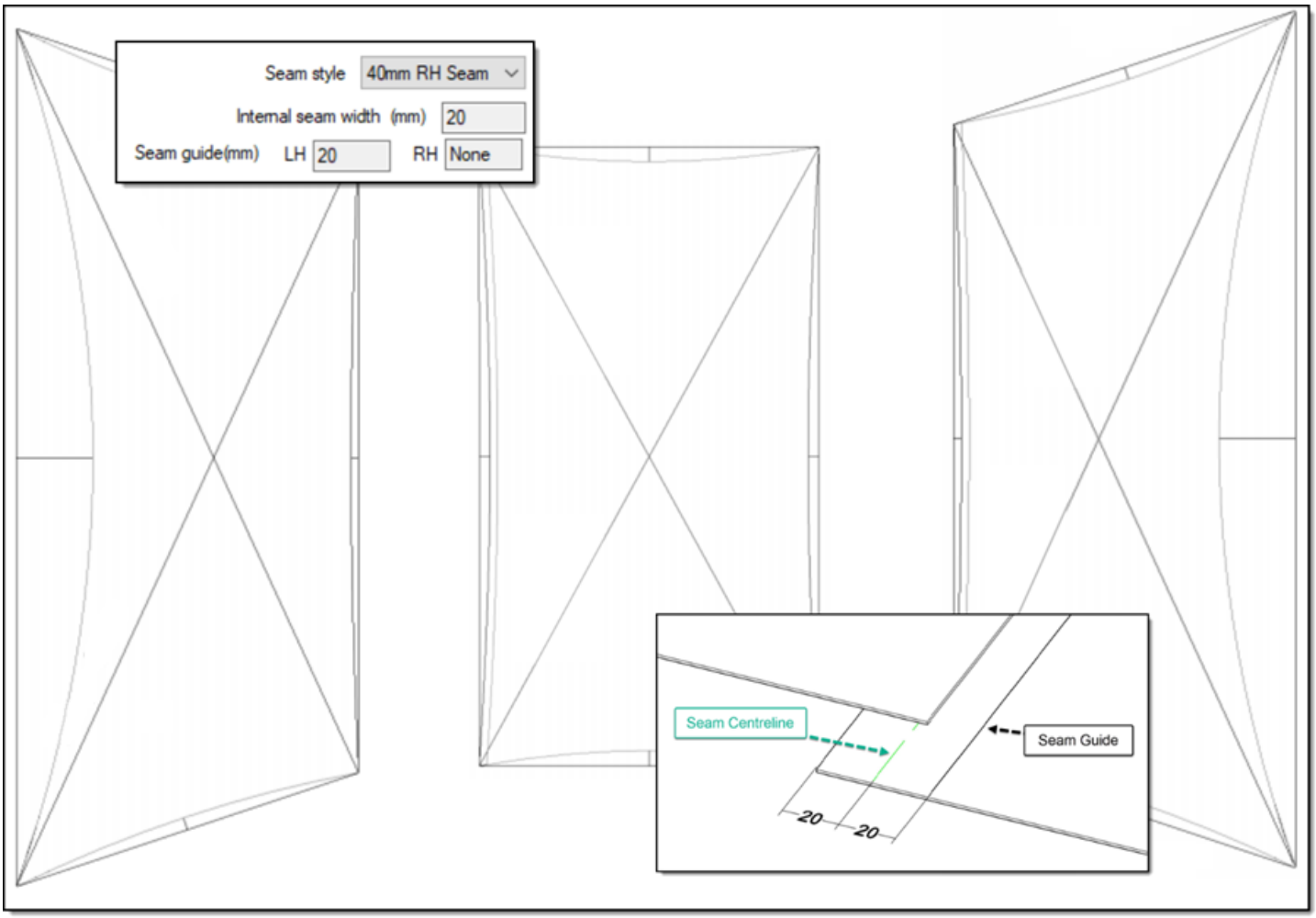
A seam style of old Shade Designer files (prior to v12) are labeled "Unnamed" to ensure compatibility.

The "Standard" seam style will add the specified "internal seam width" value to both seam edges and if seam

guides are checked and set to 0 the guidelines will represent the seam centreline. If seam guides are set to greater than 0 the guides will be drawn inward of the seam centreline.



Other seam styles can be added to the seams database and be defined by any names you choose - the example below produces a 40mm lap seam with the right panel edge lapping the left panel edge and a seam guide is added to the left panel edge 20mm inward of the seam centreline (40mm in from the fabric edge) and no guide on the right panel edge.

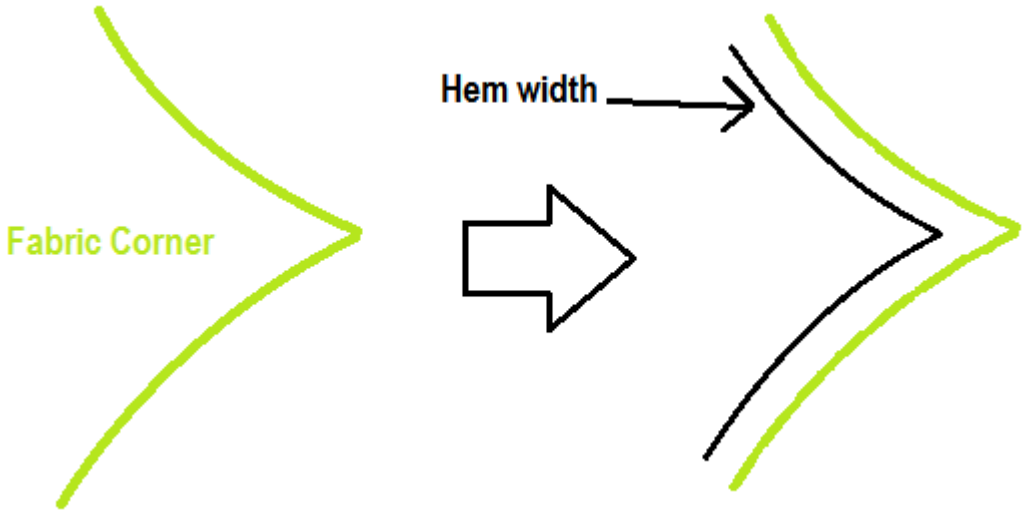


Cutting fabric from the pattern

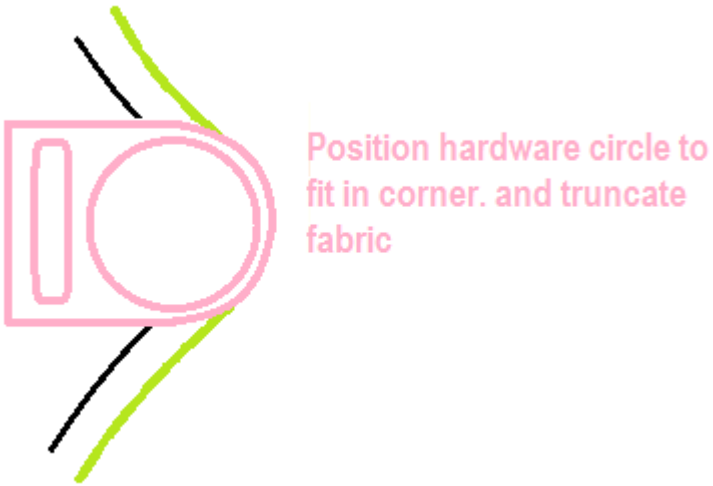
The process for cutting fabric from the pattern is as follows:

- Lay out one (or more) pieces of fabric large enough to support the pattern. (This may need two pieces sewn together.)
- Measure and mark the corner positions from the supplied dimensions.
- Use a bendable straight edge to create the curves on each side, with the center dip as specified.

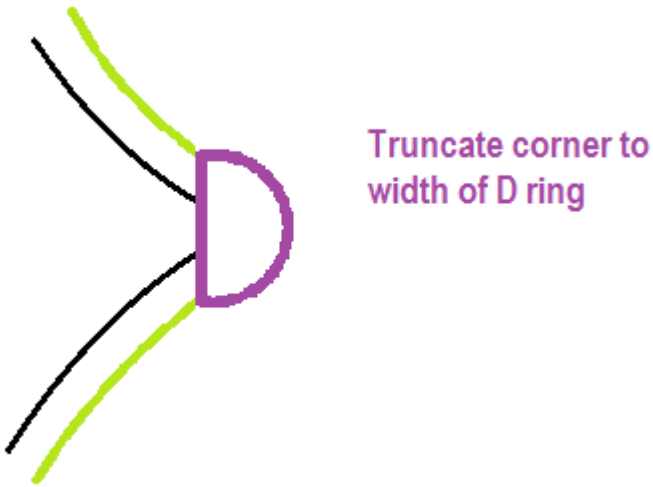
- Mark and cut out the pattern.
- Turn back and sew the sail edges to the specified hem width, as shown here:



- If the corner is "Fit hardware circle in corner", i.e.- like an EZ Glide were the cable fits around the corner hardware, then position the corner hardware in the corner so that the sail edge is tangential to the hardware circle, as shown here:



- If the corner is not "Fit hardware circle in corner", i.e.- like a D ring, then position the hardware in the corner so that the base of the hardware fits across the corner, as shown here:



- Trim the corner to fit. A drawing showing this is available here.

Truncation offset

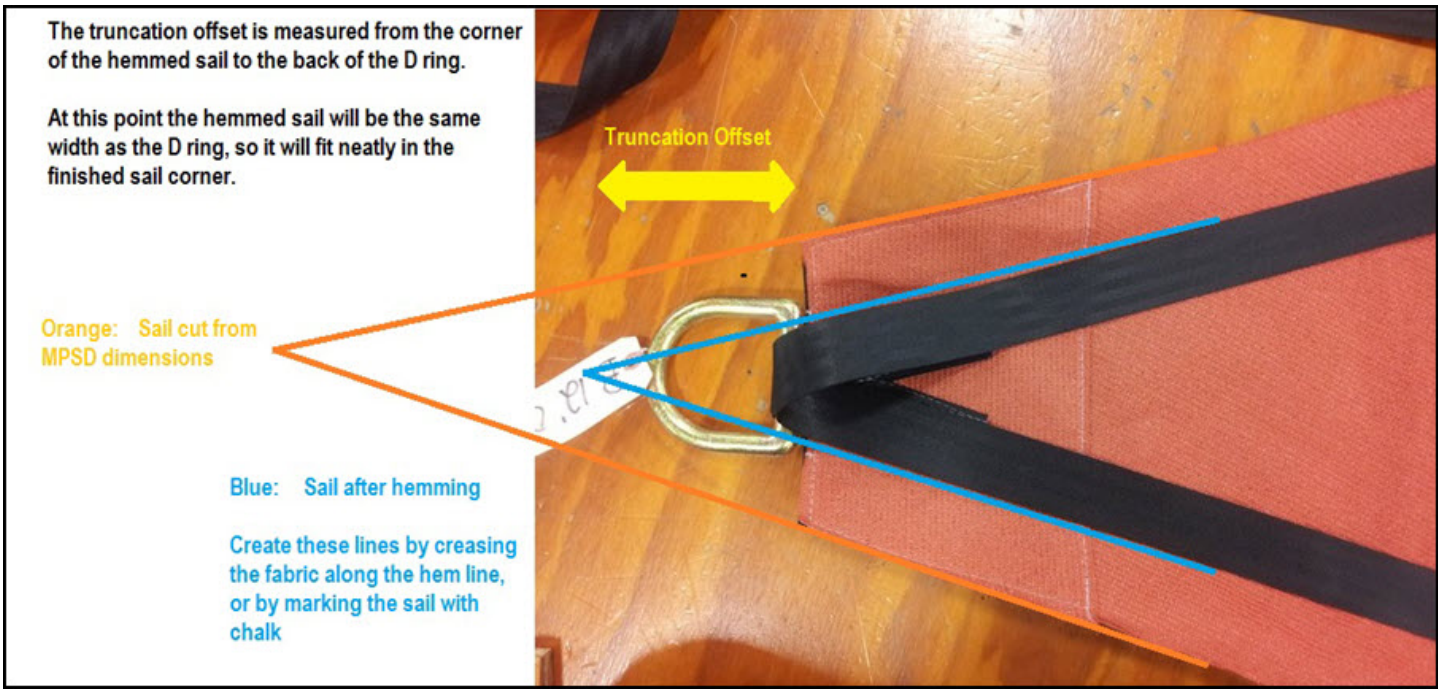
The truncation offset is shown on the Corner Details report. They are also reported on the production reports and on the estimation page.

It is the amount that the hemmed sail has to be cut back to fit the corner hardware. The truncation offset is automatically allowed for during the sail calculations by deliberately making the sail larger than the pole-pole measurements, so that after the sail corners are truncated the sail will fit exactly between the poles.

To obtain the correct trim position on a hemmed corner you can:

a) measure back from the corner by the truncation value or
b) trim at the point where the hardware fits neatly into the corner.

These two method should give approximately the same results. The following drawing helps to make the corner truncation clear:



Imports

- **Partial model file**

When you use the MPSD Web App (www.mpcalc.com) the model file emailed to you contains the site dimensions, but no details like corner hardware dimensions, hem widths, etc. This is a partial model file.

The partial model file can be opened in MPSD as a normal file, and will find the missing data from:

a) A template file, if you have previously created one, and if the template is in the same dimensions as the partial model file

b) The MPSD default settings file.

- **Import pole top dxf**

Reads a dxf file that contains a 3dpoly drawn between the pole tops, in the order A..B..C..D etc.

The import supports several styles:

- **3D polylines**

This information would usually come from automated measuring equipment such as the Prodim Proliner.

There can be exactly one 3D polyline in the dxf file, which will be used to define the pole tops.

Or there can be any number of 3D polylines, with exactly one 3D polyline on a layer beginning with "P" (pole tops)
Optionally there can also be exactly one 3D polyline on a layer beginning with "G" (ground) to define the average pole bottoms.

The polyline will contain one point for each pole top, so valid number of points are 3, 4, 5 or 6

- **Points**

This information would usually come from automated measuring equipment such as the Leica Disto

There will be exactly the same number of points in the dxf as pole tops, so valid numbers are 3, 4, 5 or 6

- **Points with a 3 point ground**

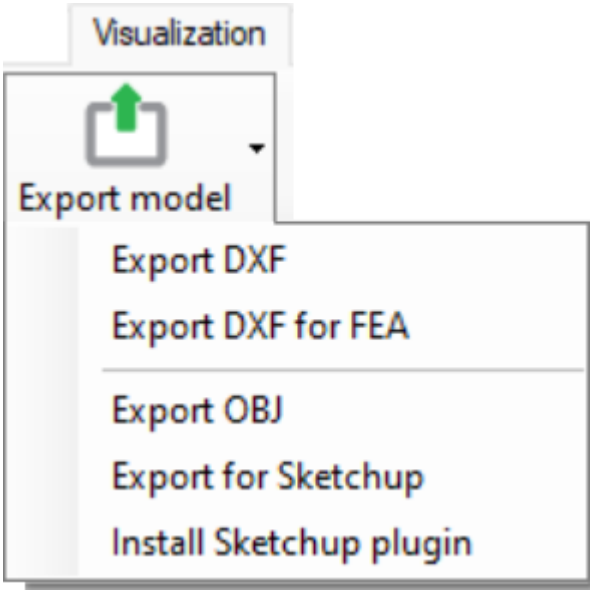
Same as above, but the first 3 points are taken to define the ground level.
So valid number of points are 6, 7, 8 or 9

There is no information in a dxf about the measurement units, so you have to choose units in MPSD to match the units used for measuring.
Formatting of the units is performed, so measurements in inches can be used as feet_inches or feet_inches_fractions.

The dxf information is in XYZ format, so the program will calculate the equivalent pole top to pole top dimensions, and enter them in the measurement tables. This means that the measurement error, reported during calculation, will always be zero, so no real checks on the measurement accuracy are being made.

Exports

MPanel Shade Designer can export the model or the panels in several formats:



- **Export DXF model**

Exports the model in dxf format, suitable for most cad platforms.
The membrane is modeled as a 3D polygon mesh, the poles are modeled as 3D polylines, and the corner links as lines.
The default folder for the export is: Documents\Mpanel Shade Designer\Exports (You can find the Documents folder from the Windows start menu)
There will be two models superimposed on each other. The model on layers MPEmesh and MPElines is the enhanced model with the corner details added. Normally you will delete / turn off some layers to select just one of the models.

- **Export DXF for FEA**

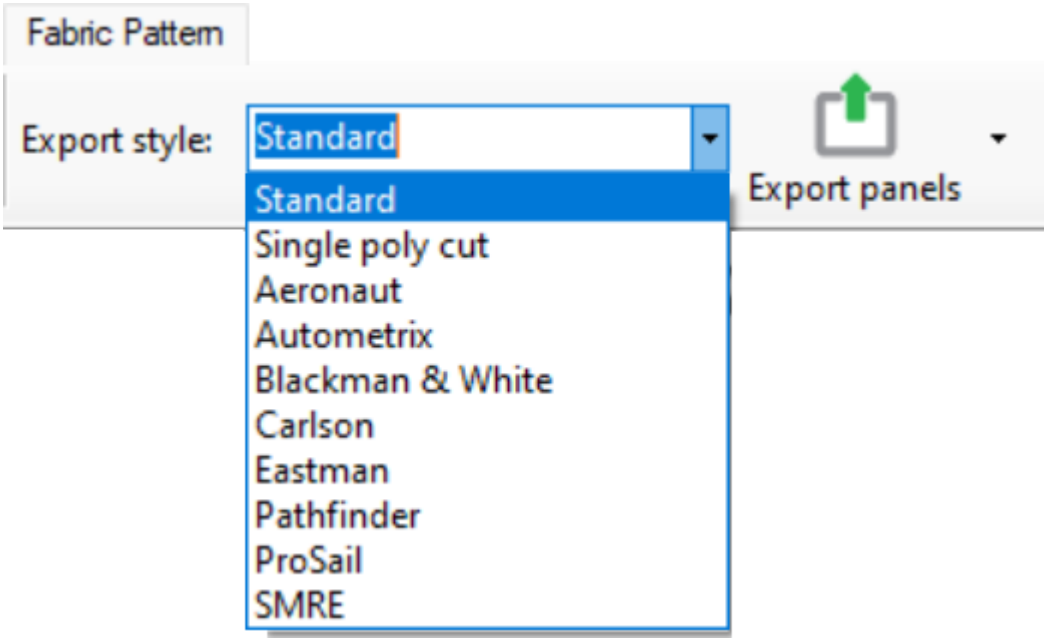
Exports the model in dxf format as above however, the model is amended to be read directly into MPanel FEA software. MPanel FEA (Finite Element Analysis) allows environmental loads such as wind, snow etc to the mesh to determine fabric stresses, cable tensions, reactions, post bending moments and estimations of footings.

- **Export OBJ model**

Exports the model in obj format, suitable for reading in Awning Composer.
Coordinate transformation and scaling are performed to suit the Awning Composer format.
The membrane is modeled as a set of faces. Poles are also modeled if they have a diameter greater than zero.
The default folder for the export is: Documents\Mpanel Shade Designer\Exports (You can find the Documents folder from the Windows start menu)

- **Export model for Sketchup**

Exports the model in mpx format, suitable for reading in Sketchup with the MPanel Sketchup plug in.
Scaling is performed to suit the Sketchup format, you should use the same units in Sketchup and MPanel Shade Designer.
The membrane is modeled as a surface. Poles are also modeled as a closed surface if they have a diameter greater than zero.
The default folder for the export is: Documents\Mpanel Shade Designer\Exports (You can find the Documents folder from the Windows start menu)
The MPanel Sketchup plug in can be installed from the menu item "Install MPanel Sketchup plug in"



- **Export panel**

Exports the panel in a format suitable for cutting machines. Several different export styles are supported to suit different cutting machines.
The default folder for the export is: Documents\Mpanel Shade Designer\Exports (You can find the Documents folder from the Windows start menu)

Standard
The panel is drawn as a group with 3 or 4 polylines for the panel edges on layer C
The sewing guidelines are drawn on layer A
All other dimensions and annotation on layer R

Single Poly
The panel is draw as a group with 1 polyline for the panel edges on layer C
The sewing guidelines are drawn on layer A
All other dimensions and annotation on layer R

Aeronaut
The panel is drawn as a block with 1 polyline for the panel edges on layer CUT
The sewing guidelines are drawn on layer CREASE
A slash mark for the tag corner is drawn on layer DRAW
A panel number is drawn in the middle of the panel on layer TEXT

Autometrix
The panel is drawn as a group with 1 polyline for the panel edges on layer CUT colour RED
The sewing guidelines are drawn on layer DRAW colour GREEN
All other dimensions and annotation on layer TEXT colour YELLOW

Blackman & White
The panel is drawn as a group with 1 polyline for the panel edges on layer CUT colour MAGENTA
The sewing guidelines are drawn on layer CREASE colour BLUE
All other dimensions and annotation on layer TEXT colour BLACK

Carlson
The panel is drawn as a block with 1 polyline for each panel edges on layer CUT
The sewing guidelines are drawn on layer PLOT
All reference information is drawn on layer CARLSON_ANNOTATION

Eastman
The panel is drawn as a block with 1 polyline for each panel edges on layer CUTME

The sewing guidelines are drawn on layer PENME
All reference information is drawn on layer PENME

Pathfinder
The panel is drawn as a block with 1 polyline for each panel edges on layer CUTLINE
The sewing guidelines are drawn on layer PENLINE
All reference information is drawn on layer PENLINE

ProSail
The panel is drawn as a block with 1 polyline for the panel edges on layer CUT
A slash mark for the tag corner is drawn on layer DRAW
A panel number is drawn in the middle of the panel on layer TEXT

SMRE
The panel is drawn as a group with 1 polyline for the panel edges on layer 42
The sewing guidelines are drawn on layer 1
All reference information is drawn on layer 0

For standard and single poly exports the layer names can be redefined by adding this section to the application ini file:
(the ini file is in a location like C:\Users\User name\AppData\Roaming\MPanel Shade Designer.ini)

[Export]
Cut layer = My cut name
Reference layer = My reference name
Annotation layer = My annotation name

Notes:
Awning Composer is distributed by Tri Vantage Inc, and is a registered trademark of Glen Raven Inc.
Sketchup is distributed by Trimble Inc, and is a registered trademark of Trimble Inc.
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Contact List and Technical Support

Technical support is available to customers who:

Have a valid annual technical support contract
or purchased MPanel Shade Designer within the previous 12 months
or are evaluating an MPanel Shade Designer demo product

In general, it is best to send the model file (*.mpm) as an attachment to the email, as this will allow us to respond specifically to your question.
The model file can be found using the *Folders* button on the start page.

Support questions should be sent to:
support@mpanel.com

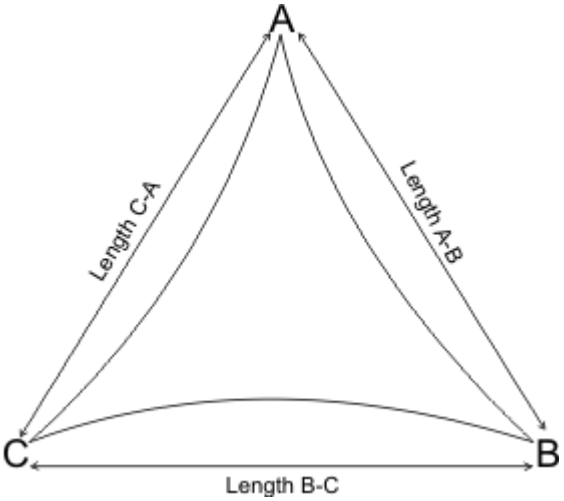
Short Video: How to send a file to support

Shape limits

During the calculations the model shape is checked to be within defined recommended shape limits. The shape limits used should be considered "design guides" and are described below:

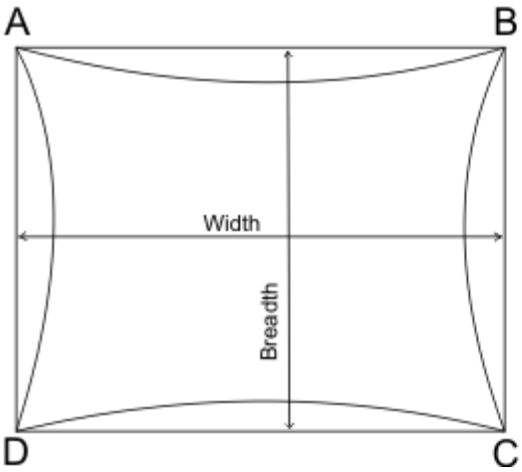
Height Ratio Explained

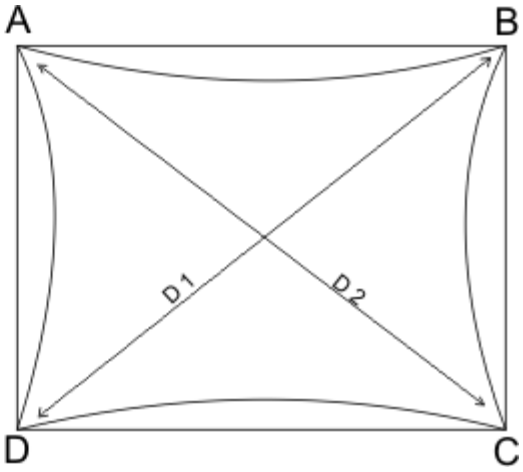
- **3 sided sails**




```
Edge ratio:          the ratio of the longest edge to the shortest edge is recommended to
be less than 1.5
Height ratio:        (highest corner - lowest corner) / average edge length is
recommended to be more than 0.2
```

- **4 sided sails**

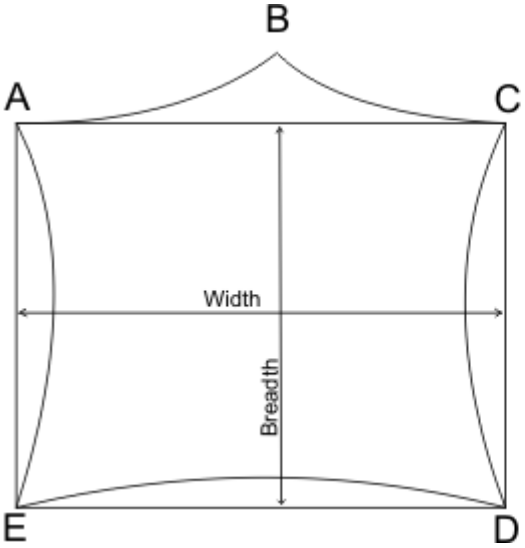


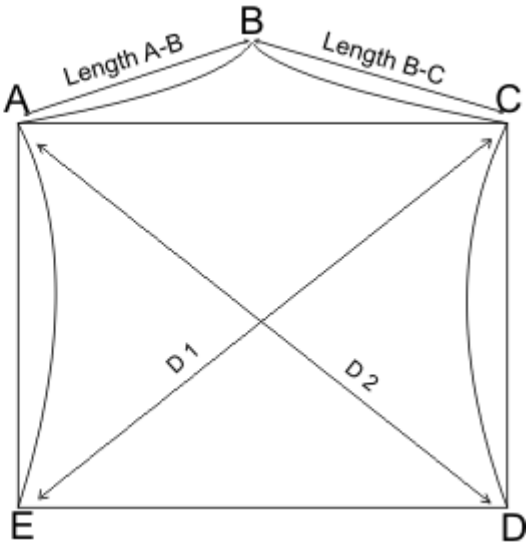



```
Squareness ratio:    the ratio of width / breadth (or the inverse) is  recommended to be
less than  2.00
Diagonal ratio:      the ratio of the diagonals  (or the inverse) is  recommended to be
less than 1.75
Height ratio:        measured by rotating the model until diagonal AC is flat on the
```

ground,
and corners B and D are equal height.
The ratio is then height of corner B / (average breadth and width)
and is recommended to be above 0.25

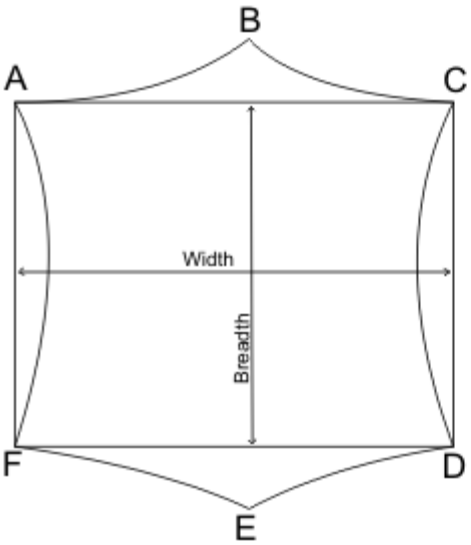
- **5 sided sails**

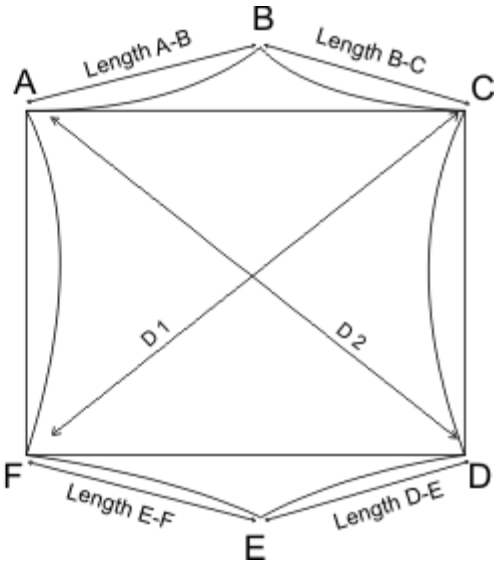




Width-breadth ratio: the ratio of width / breadth (or the inverse) is recommended to be between 0.66 and 2.50
Diagonal ratio: the ratio of the diagonals (or the inverse) is recommended to be less than 1.75
Center offset ratio: how far length AB / (length AB + BC) is from 0.5 (the center), recommended to be less than 0.16
Height ratio: measured by rotating the model until corners D, E and the midpoint of AC are
flat on the ground. The ratio is then height of corner B / (average breadth and width)
and is recommended to be above 0.25

- **6 sided sails**





Width-breadth ratio: the ratio of width / breadth (or the inverse) is recommended to be between 0.66 and 2.50
Diagonal ratio: the ratio of the diagonals (or the inverse) is recommended to be less than 1.75
Center offset ratio: how far length AB / (length AB + BC) (or the same measurement

```
with DE and EF)
                        is from the center at 0.5,  recommended to be less than 0.16
Height ratio:           measured by rotating the model until corners A, C, and E are flat
on the ground
                        The ratio is then the average height of corners B, D and F  /
(average breadth and width)
                        and is recommended to be  above 0.25
```

Advanced Settings

The following settings can be changed by opening the MPSD ini file in a text editor, and adding the appropriate settings to the end of the file. The ini file can be found in your personal folder in a place like:

C:\Users\UserName\AppData\Roaming\MPanel Shade Designer\MPSD.ini

To change panel export layers (possibly to suit a particular cutting machine) change C, A and R to suit and add this section:

[Export]
```
Cut layer = C
Annotation layer = A
Reference layer = R
```

To change default file locations (possibly to have a common database on a network) change the fully qualified file addresses to suit and add all or part of this section:

[User file settings]
```
Database path = E:/MPSD/database
Model path = E:/MPSD/model
```

In the User Settings section you can:

Alter the number of iterations used when straightening seams, the default is 1000.

[User Settings]
Geo iterations = 500

Change the name of the visualization reports:

[User Settings]
Visualization name = my choice of name

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System requirements

These are the minimum requirements to run MPanel Sade Designer version 10

```
Operating system:       at least Windows Vista   (Windows 10, Windows 8.1, Windows 8,
Windows 7 are all OK)
Net framework:          at least Net 4.5
Graphics card:          should support OpenGL, at version 2 or above.
                        (alternatively DirectX can be used but may show lower quality
graphics)
```

Notes:

Operating systems before Windows 8 will need to have Net 4.5 installed. If this is missing then it will be asked for during program installation.

Due to the requirement for Net 4.5, it is not possible to run this program on Windows XP

If your graphics card gives a poor image, try these steps:

a) turn *video card hardware acceleration* **off** in the start page menu item Settings. Then restart the program.

b) turn *use DirextX* **on** in the start page menu item Settings. Then restart the program.

Use of these settings will give somewhat lower quality graphics, with a slower frame rate, but may enable a computer with a low specification graphics adapter to run Shade Designer satisfactorily.

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