Conclusion

Knowing through making

Materials influence the way in which they are used in the landscape. Expressive construction encompasses staying true to a material’s properties, and revealing their construction techniques in an exaggerated and patterned way. A repetitive pattern of folded textiles used as a canopy not only reveals its construction (folding) but this acts as aesthetic element. Regional aesthetics also plays a role in revealing the material’s context. Shweshwe is a textile typically used in traditional Sotho garment construction, and is iconically South African. Landscape architectural tectonics harvests natural forces to reveal, sustain, and guide the form-making of pre-manufactured elements. The patterned and repetitive use of a functional element such as folded surface panels that allow the growth of plants through their openings over time reveals natural processes over time. Through the process of hand-making, combined with computer modelling, the properties and potential of textiles were discovered, leading to an iterative design response which progressed from a detailed to a larger scale.
References

@QL RS QNMF +èC-D-è%èAdkk+èB-I-è1/ 04-èRo bdè T m(udhkdc+èhmè


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References


Other works consulted:


Image references:


1. Make slipknot:
   1.1. Measure three forearm lengths of rope/twine (henceforth referred to simply as yarn) for the tail
   1.2. Place the working yarn to the left; make a loop with the yarn and ensure that the long end of the tail crosses the shorter end; hold the crossing between index and middle fingers
   1.3. Pull the short end of the tail through the loop and tighten

2. Slide slipknot over right wrist

3. Create stitches:
   3.1. Hold the working yarn in between the ring and pinkie fingers of left hand, with the palm of the hand facing towards the knitter. Ensure the working yarn is further away from the body, and that the tail is the strand closer to the body
   3.2. Place left thumb and left middle finger in gap between the working yarn and tail
   3.3. Slide the working yarn over the left middle finger, and the tail over the thumb. Ensure that palm faces upwards.
   3.4. Place right hand in gap between the yarn on left hand closest to the body, and then over the one furthest away from body. Loop hand towards the body and slide the loop over wrist.
   3.5. Repeat until the required number of stitches is achieved (10 stitches in Samples 1, 2 and 3)

4. Hold the working yarn in the right hand. Ignore the tail end for the remainder of the knitting process.

5. Pull the stitch closest the wrist over the right hand, and drop it. Keep the working yarn in the right hand.

6. Place the left hand through the loop created, from the back towards the body.

7. Tighten the yarn slightly over the left arm.

8. Repeat Steps 4 and 5.

9. Place the left hand through the loop created, from the front and away from the body.

10. Repeat Steps 8 and 9 until all of the stitches are on the left arm.

11. Hold the working yarn in the left hand.

12. Pull the stitch closest the wrist over the left hand, and drop it. Keep the working yarn in the left hand.

13. Place the right hand through the loop created, from the back towards the body.

14. Tighten the yarn slightly over the right arm.

15. Repeat Steps 11 and 12.

16. Place the right hand through the loop created, from the front and away from the body.

17. Repeat Steps 15 and 16 until all of the stitches are on the right arm.

18. Carry on knitting until the desired length of sample is achieved.

19. Cast off (if stitches are on the right arm):
   19.1. Follow Steps 4, 5 and 9 to make two stitches over the left arm
   19.2. Take the stitch closest to the body with the right hand, and pull over the left hand. Drop the stitch.
   19.3. Follow Steps 4, 5 and 9 to make one more stitch.
   19.4. Repeat Step 19.2.
   19.5. Repeat Steps 19.1 to 19.4 until all of the stitches have been cast off.

If stitches are on the left arm, follow Steps 19.1 19.5, but switch the arm orientation.

20. Trim the tail yarn and working yarn with scissors.

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Samples 1, 2, 3:

Instructions


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Parametric definitions


Appendix A

Instructions

Samples 1, 2, 3:

1. Make slipknot:
   1.1. Measure three forearm-lengths of rope/twine (henceforth referred to simply as "yarn") for the tail
   1.2. Place the working yarn to the left; make a loop with the yarn and ensure that the long end of the tail crosses the shorter end; hold the crossing between index and middle fingers
   1.3. Pull the short end of the tail through the loop and tighten

2. Slide slipknot over right wrist

3. Create stitches:
   3.1. Hold the working yarn in between the ring- and pinkie fingers of left hand, with the palm of the hand facing towards the knitter. Ensure the working yarn is further away from the body, and that the tail is the strand closer to the body
   3.2. Place left thumb and left middle finger in gap between the working yarn and tail
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4. Hold the working yarn in the right hand. Ignore the tail end for the remainder of the knitting process.

5. Pull the stitch closest the wrist over the right hand, and drop it. Keep the working yarn in the right hand.

6. Place the left hand through the loop created, from the back towards the body.

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If stitches are on the left arm, follow Steps 19.1 – 19.5, but switch the arm orientation.

20. Trim the tail yarn and working yarn with scissors.
<table>
<thead>
<tr>
<th>Sample no.</th>
<th>Purpose</th>
<th>Material</th>
<th>Fabrication technique</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To create shade-providing, overhead-defining element</td>
<td>Polypropylene twine: 3 mm diameter&lt;br&gt;Breaking strength: 50 kg</td>
<td>Warp arm knitting - no tools required</td>
<td>Based on 10 garter stitches</td>
</tr>
<tr>
<td>2</td>
<td>To create shade-providing, overhead-defining element</td>
<td>Flat polyethylene braided ski rope:&lt;br&gt;10 mm diameter&lt;br&gt;Breaking strength: 330 kg</td>
<td>Warp arm knitting - no tools required</td>
<td>Based on 10 garter stitches</td>
</tr>
<tr>
<td>3</td>
<td>To create shade-providing, overhead-defining element</td>
<td>Jute braided rope: 7 mm diameter&lt;br&gt;Breaking strength: 154 kg</td>
<td>Warp arm knitting - no tools required</td>
<td>Based on 10 garter stitches</td>
</tr>
<tr>
<td>4</td>
<td>To explore folding as spatial element</td>
<td>210 g/m² paper</td>
<td>Folding by hand</td>
<td>Basic parabola fold (Jackson 2011)</td>
</tr>
<tr>
<td>5</td>
<td>To explore the possibilities of folding as a means to create space as well as to containment for plants</td>
<td>160 g/m² paper</td>
<td>Folding by hand</td>
<td>Basic V-pleat (Jackson 2011)</td>
</tr>
<tr>
<td>6</td>
<td>To explore the possibilities of folding as a means to create space as well as to containment for plants</td>
<td>160 g/m² paper</td>
<td>Folding by hand</td>
<td>Multiple V-pleats (Jackson 2011)</td>
</tr>
<tr>
<td>7a</td>
<td>To make a mould to shape textiles</td>
<td>2 sheets of 1mm thick cardboard</td>
<td>Folding by hand</td>
<td>Based on sample 6.</td>
</tr>
<tr>
<td>7b</td>
<td>To explore textile manipulation</td>
<td>Weed-control textile</td>
<td>Oven-baking in cardboard mould at 120 °C for 60 minutes.</td>
<td>Based on sample 6.</td>
</tr>
<tr>
<td>Details</td>
<td>Observations</td>
<td>Opportunities</td>
<td></td>
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<tr>
<td>--------</td>
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</tr>
</tbody>
</table>
| Length of twine used: 100 m  
Dimensions: 1800 x 210 mm  
Area: 0.378 m$^2$ at rest  
Time taken: 1.5 hours | - Elastic properties of the sample cause irregularities in shape-expansion at points of restraint and contraction in areas with no contact to external support.  
- Twine is too thin to provide sufficient shade  
- Sample weighed down at its centre of gravity appears drooping and "weak"  
- Yarn to surface ratio is small.  
- Shadows and texture form visual interest | Use thicker twine for  
- sturdier sample  
- smaller stitch sizes to increase shading capacity  

*How is this sample more appropriate than conventional shade structures?*

- Even though sample appears “weak”, it can have poetic and dynamic movement and shadow-casting properties  
- Can be draped |
| Length of rope used: 15 m  
(longest available length in-store)  
Dimensions: 500 x 160 mm  
Area: 0.08 m$^2$  
Time taken: 20 minutes | - Sample area very small  
- Difficult to achieve a uniform knit with rope of that diameter  
- Untidy appearance  
- Keeps its shape  
- Unravels easily: rope surface is smooth, and too thick for sufficient control  
- Provides more shade than sample 1 | Use rope or twine that is thinner than sample 2, but thicker than sample 1.  
- Rope or twine to have better gripping qualities.  

*Can have robust qualities on ground plane*  
- Natural fibres have more grip than synthetic rope  

*Is knitting the most effective method to create space-defining elements?* |
| Length of rope used: 30 m  
(longer lengths did not fall within allocated budget)  
Dimensions: 700 x 240 mm  
Area: 0.168 m$^2$  
Time taken: 45 minutes | - Sample area relatively small- *not cost-effective?*  
- More effective as shade-providing element than sample 1  
- More sturdy than sample 1  
- More neat than sample 2  
- Rope doesn’t unravel like sample 2  
- Shadows and texture form visual interest  
- Provides greater width for same number of stitches used (in comparison to sample 1) | - Can have robust qualities on ground plane  

*Can offer visually appealing spatial definition*  
- Use rope or twine that is thinner than sample 2, but thicker than sample 1.  
- Use thicker twine for  
- sturdier sample  
- smaller stitch sizes to increase shading capacity |
| Paper dimensions before folding: 380 x 380 mm  
Dimensions at rest: 360 x 360 mm  
Span area at rest: 0.130 m$^2$  
Time taken: 45 minutes | - Can expand and collapse  
- Offers spatial definition in multiple dimensions and planes  
- Can be up-scaled easily | - Can offer visually appealing spatial definition  
- Use different V-folds to investigate containing properties further  

*Can offer visually appealing spatial definition*  
- More “compartments” could further define overhead pockets for planting. |
| Paper dimensions before folding: 280 x 200 mm  
Dimensions at rest: 265 x 190 mm  
Span area at rest: 0.018 m$^2$  
Time taken: 30 minutes | - Can expand and collapse more easily than sample 4  
- Valleys have intrinsic containment capacity | - Can offer spatial definition on different planes  
- More "compartments" could further define overhead pockets for planting. |
| Paper dimensions before folding: 200 x 150 mm  
Dimensions at rest: 170 x 140 mm  
Span area at rest: 0.0238 m$^2$  
Time taken: 45 minutes | - Pattern appears more promising for containment | - Due to its flexible yet rigid nature it can be used on the ground plane for e.g. erosion control.  
- Edges are open, thus patterns with contained edges should be investigated as containment options. |
| Cardboard dimensions before folding: 250 x 250 mm  
Dimensions at rest: 230 x 230 mm  
Span area at rest: 0.053 m$^2$  
Time taken: 20 minutes per sheet | - Successful transfer of paper folding onto textile.  
- Folded textiles can be reproduced easily with the mould. | See sample 6  
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Appendix B  Parametric modeling scripts
Appendix C

Knotting and weaving explorations

Tensegrity model with textiles as tension members

Weight of Asparagus plumosus

Weight of a textile pocket once saturated with water

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Appendix C

Process work

Knotting and weaving explorations

Tensegrity model with textiles as tension members

Weight of Asparagus plumosus

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