

UBC Social, Ecological Economic Development Studies (SEEDS) Student Report

Sustainable Screens

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sustainable screens

ubc seeds project | spring 2002



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eileen gray. *brick screen*.
black laquer finish.
one of several versions.



above: exhibition of gray's work by RIBA,
heinz gallery, london (1972).

top right: white laquer in salon.

bottom right: gray's monte carlo room,
bedroom boudoir exhibited in xiv
salon des artistes decorateurs (1923)



above: gray's entrance hall of rue de lota apartment.
four hundred and fifty laquered brick panels used.

precedent | screen
MOTIV interiors

a variation on eileen gray's brick screen,
where alternating vertical pivots are eliminated.
vertical continuity in strips allows for few joints.
pivot rods do not extend entire height of screen,
but connect at points.
lightweight, but easily toppled.
finished on one side with wood grain laminate.
price: \$1150

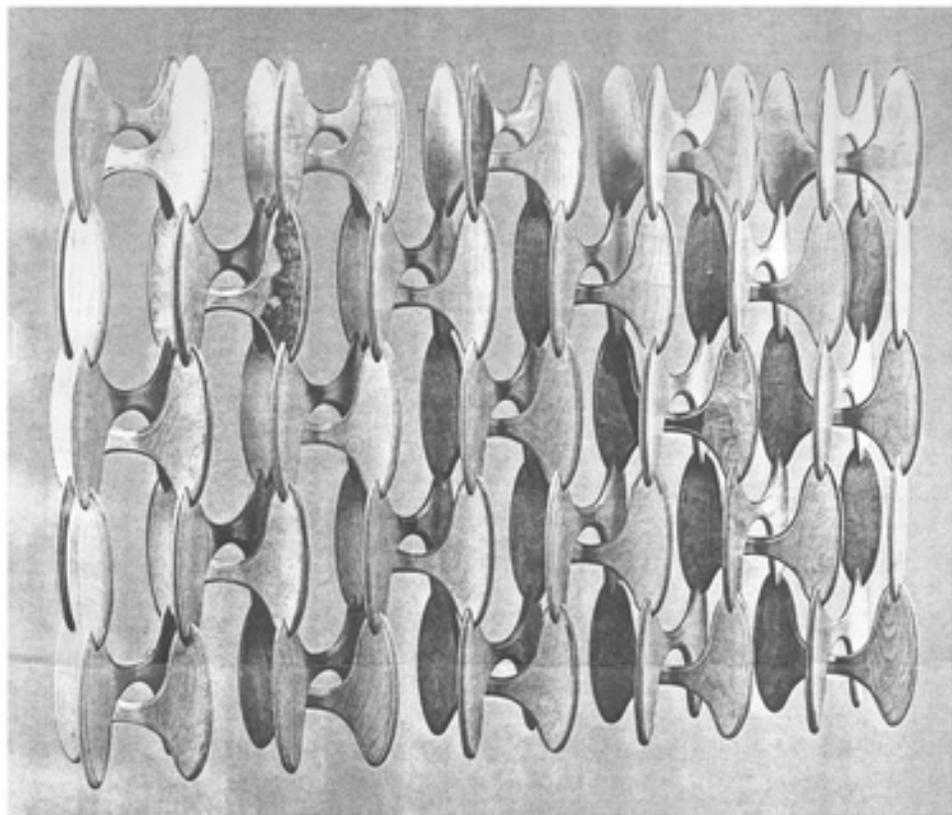


kansas city, montana firm.
baltic birch plywood.

"this freestanding modular room divider
can be assembled and disassembled in
minutes without tools..."

"...puzzle screen screen allows consumers
to purchase the number of individual pieces
they'll need to create a divider to fit
virtually any space."
- i.d. annual design review 2001

Glassman: impressed with screen's
affordability and noted its successful use
of 3d form to play with shade and shadow.



the project | introduction

The SEEDS project was developed in 1994 as an initiative to provide interdisciplinary research opportunities addressing issues of sustainability. Such an initiative must consider not only ecological sustainability, but essential and interdependent issues of economy and cultural sustainability as well. In the summer of 2002, the University will be replacing more than 600 lecture hall chairs as a result of fire code changes. The aim of this project at the School of Architecture is to propose new ways to reclaim materials from the discarded lecture seating which would otherwise be landfilled. Where the other members of this study have chosen to propose alternative uses for the the plywood seat backs, and seats themselves, I have chosen to consider the writing tablets.

The tablets themselves are a found cultural artifacts which offer an unusual and potentially beautiful form. The fact that these artifacts are always produced in mass quantities for lecture hall seating creates a particular opportunity to employ them as a repetitive modular panel to generate new agglomerate forms and new identities.

This exercise attempts to explore a variety of different opportunities to redeploy these tablets as self-supporting spatial dividing screens. In addition to the MDF tablets from the Buchanan fixed lecture hall seats, I have discovered two other surplus writing tablets that are unused and will be discarded in the future: 3/4 inch thick plywood tablet with a wood-grain-laminate surface that was to be discarded by SERF, and a smaller rectangular solid birch tablet obtained through campus facilities services. Variations in the forms of each of these tablets offers unique challenges when used as a part of a repeated modular panel. At the same time, this creates an interesting opportunity for formal exploration: minor variations in the modular component have significant formal implications for the screen as a whole.

My aim is to preserve these forms as cultural artifacts, while giving them new life, considering economically efficient means. In so doing, this will prevent waste in the interest of ecological sustainability.



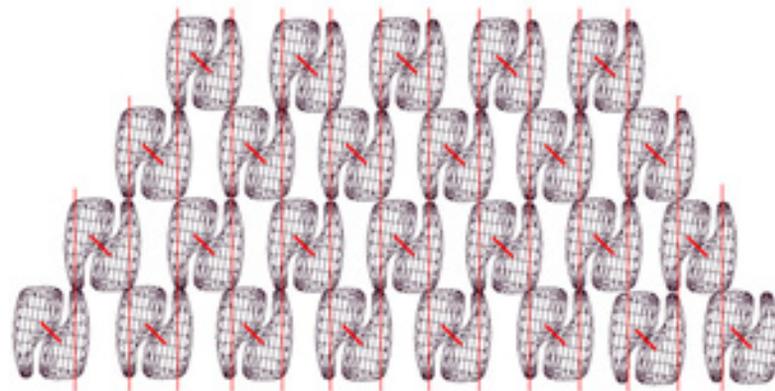
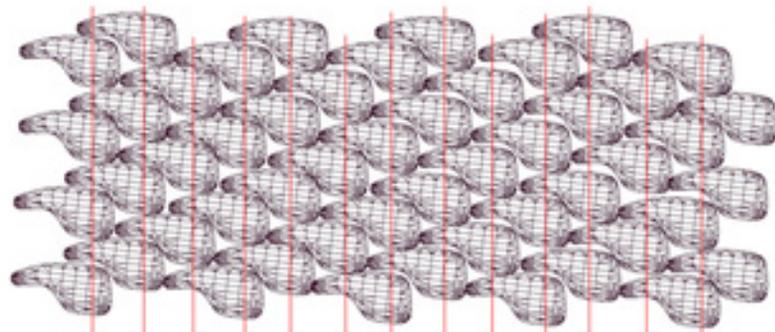
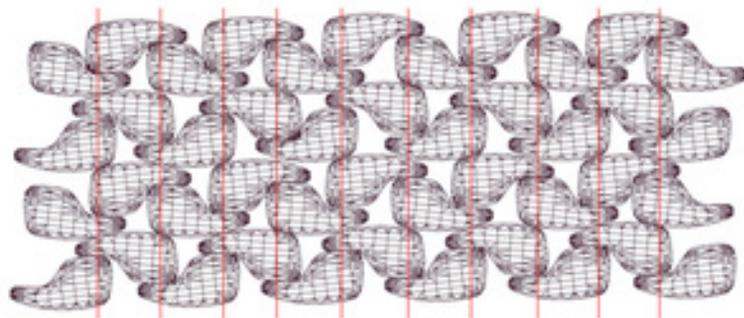


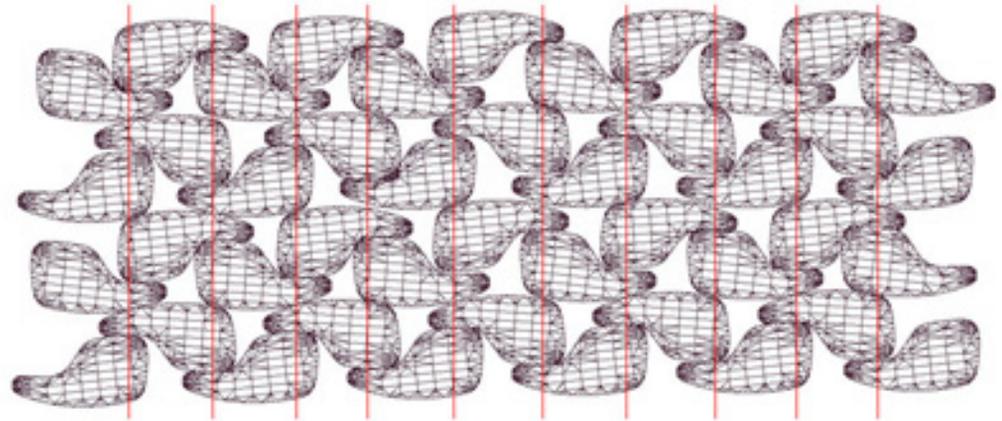
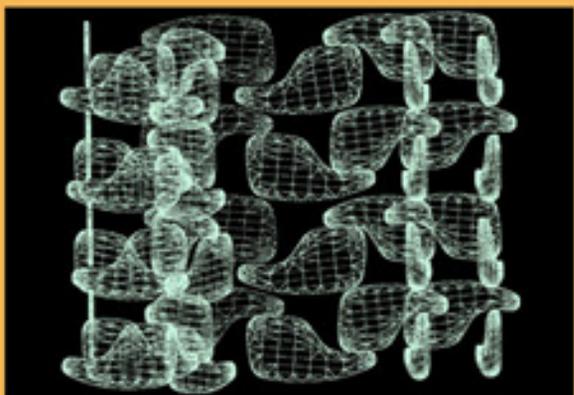
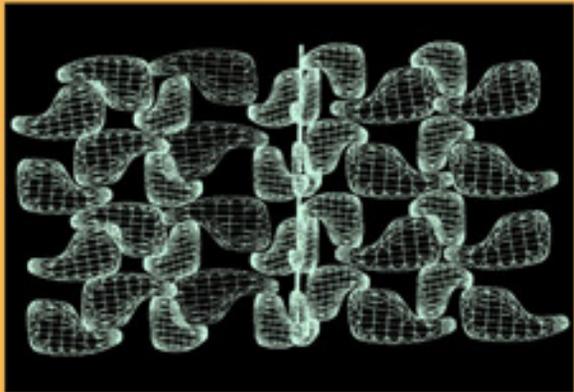
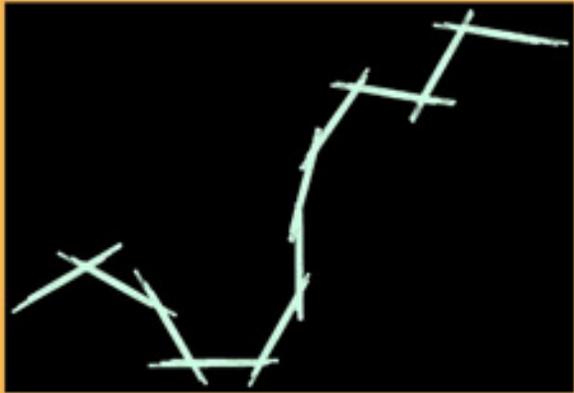
I took as a precedent the brick screen designed by Eileen Gray, however, the complex organic geometries of the tablets created a greater degree of complexity.

For the plywood tablet, I employed a method of analysis in which I used a digital model of the tablet and explored a number of different patterns of arrangement to develop an understanding of the principles by which these tablets could be repeated to form self-supporting screens.

Some observations which resulted from this exercise are:

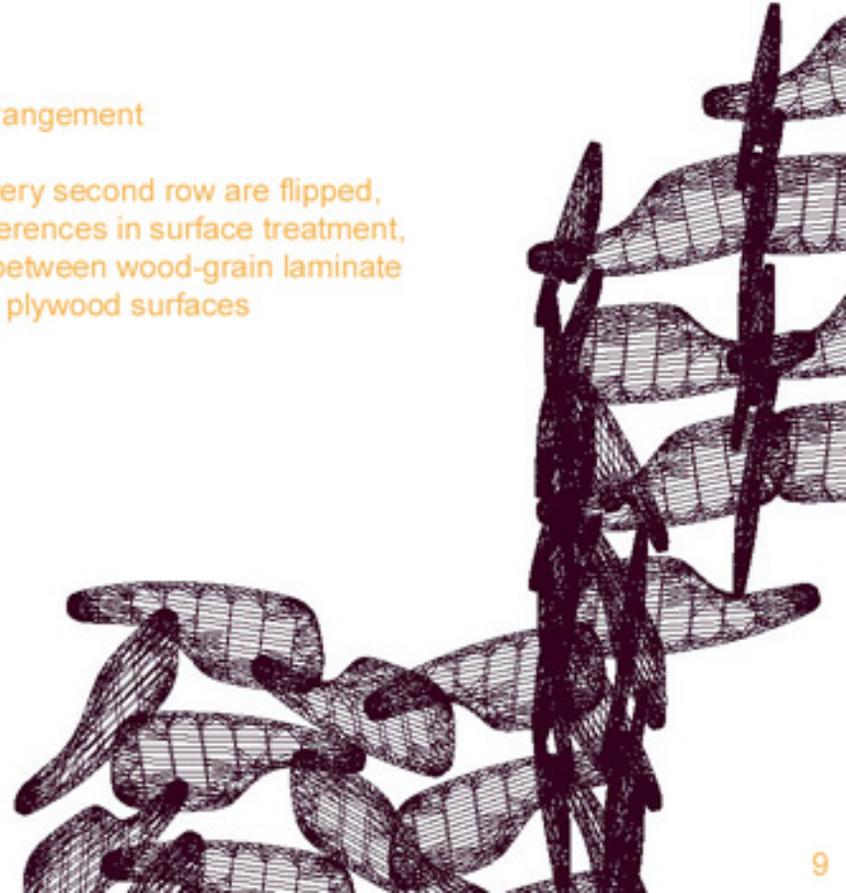
1. pivot axes must be parallel and vertical
2. just as with the brick screen, play of light and continuity of form can be created by using a consistent repetitive pattern but allowing for dynamism through pivots and gaps to create patterns of solid and void. In reality, solid and void allow light and shadow to accentuate the forms of the component bricks
3. interest can be created either by continuing curves from one brick to another, or by strategically disrupting continuity
4. the tablets are not neutral, but have direction of flow dictated by their form... this can be used to generate fluidity of flow in a particular direction, or turbulence in multiple directions
5. spacing of brick components must be considered when arranging the tablets. In reality, pivots act to make spaces more pronounced than in a 2-dimensional layout, and this has a significant impact on degree of screening function and quantities of light allowed to permeate





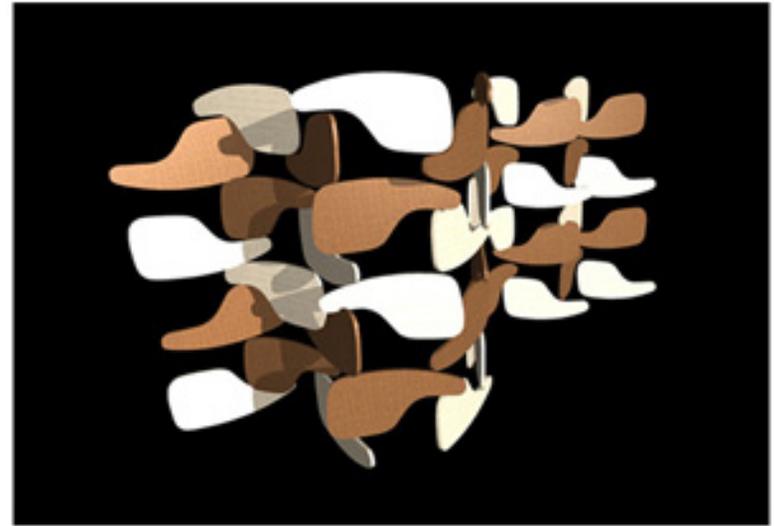
turbulent arrangement

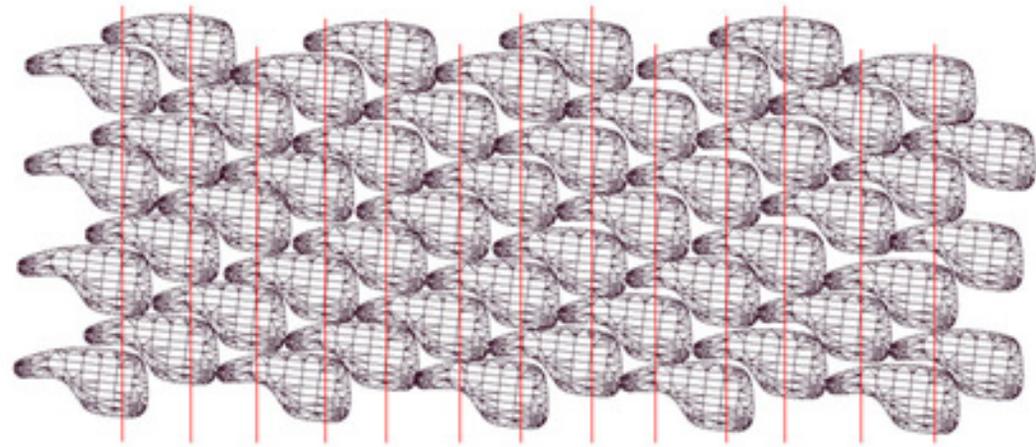
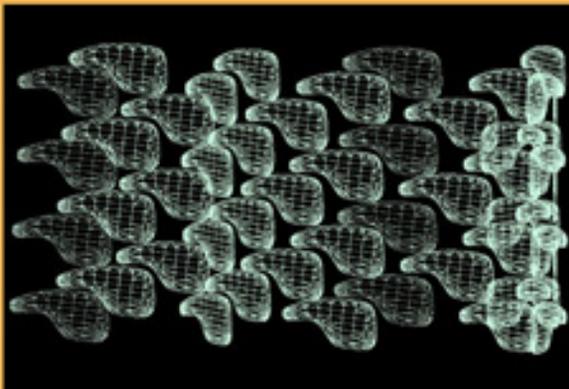
tablets in every second row are flipped, creating differences in surface treatment, alternating between wood-grain laminate and sanded plywood surfaces



In order to provide for stability, it is best to use a single continuous vertical pivot rod to ensure that pivots stay aligned.

Other things to considered are: the footings for the pivots rods, and where tablets do not meet at horizontal edges, pivoting can only be made possible by including a small spacer attached to the rod between the tablets.

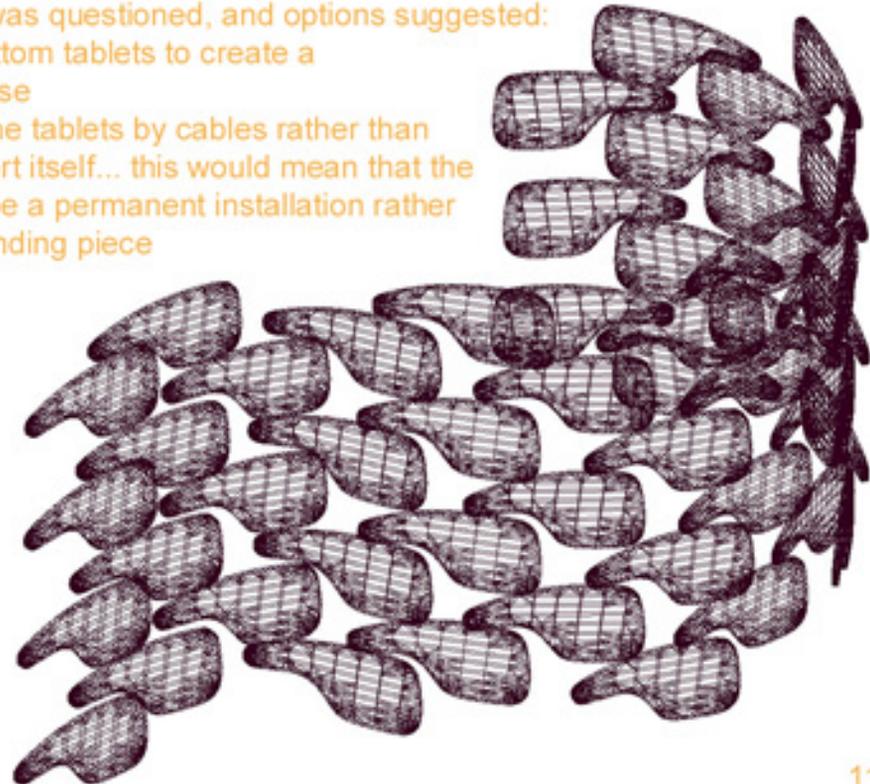




a flowing arrangement

tablets are repeated to create a directional flow.
here, stability was questioned, and options suggested:

- slicing the bottom tablets to create a more stable base
- suspending the tablets by cables rather than having it support itself... this would mean that the screen would be a permanent installation rather than a free standing piece of furniture.

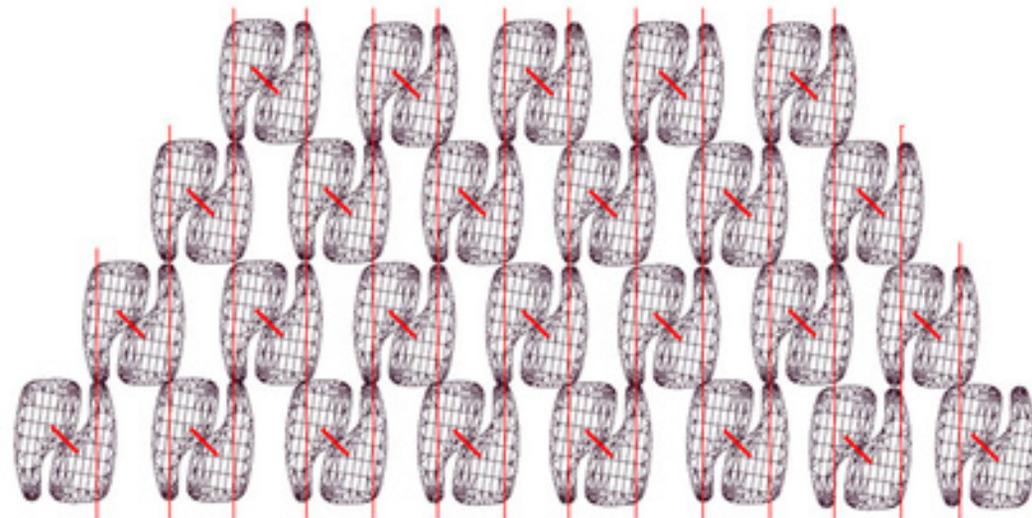




This permutation was an attempt to question the assumption that the screen must consist of strictly vertical pivots.

In essence, this arrangement is similar to Gray's "rectangular brick" arrangement, but where the rectangular modules are constructed from two tablets joined by a diagonal pivot that would allow for a limited amount of flex such that the diagonal pivot becomes a stable horizontal connection when subjected to gravity. The result would be that each brick would consist of two "legs" at different angles helping to make the construct more stable. the legs in turn pivot where they meet the lower brick, adjusting the angle by which the diagonal pivot "leans".

For this arrangement, I constructed a full scale foam model to test for stability and to examine the relationship under real physical conditions.



The resistance for the diagonal pivot in the model consists to two bolts on either side of the "brick" tied together by steel wire. The bolts limit the movement and flex is given by the wires.

If constructed as a prototype, this could be done with thinner looped rods in place of bolts and a number of different ropes and wires could be tested for elasticity and to explore tectonic expression.





The model of this screen revealed a number of complications and difficulties. Stability was a question. The model was able to support itself, but it was difficult to set up, requiring that multiple bricks be pivoted together. The added moving part of the diagonal pivot meant that pieces were given more freedom to shift in unpredictable ways when supporting bricks were knocked off balance. In a prototype, perhaps there should be a mechanism by which the diagonal pivots could be locked.

Furthermore, the large gaps between bricks were even more pronounced once assembled. Thus the arrangement did not function that effectively as a screen, but took on a more sculptural character, creating interesting shadows and depth.



The prototype screens were constructed with economical choices of materials: connections of the pivot rods to the tablets were made with larger 1/2" E.M.T. straps and smaller 1-RP cable straps which are mass produced such that bags of 25 of them can be bought for less than \$2; the 3/8 inch steel rods comprised the bulk of material cost at \$15 for 40 a foot length, and the spacers were made by cutting 1/2" diameter poly tubing into appropriate sizes.

The process of building involved:

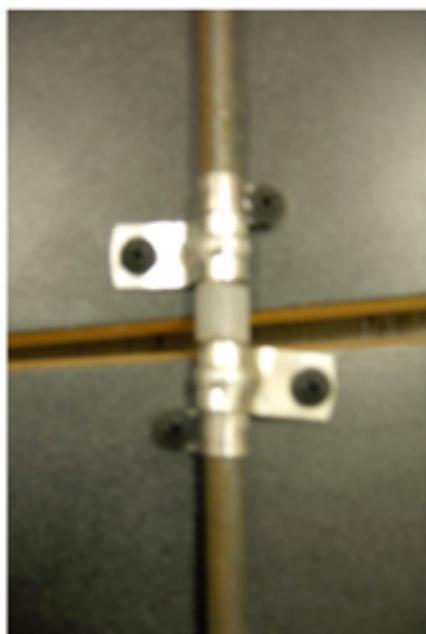
1. laying out the tablets in the desired pattern of arrangement. tablets should ideally be fixed to the ground, and a measured reference grid used.
2. assembling footings at the ends of the rods by attaching caps followed by large washers which are secured by 1" lengths of poly tubing.
3. positioning pivot rods at appropriate locations, vertically oriented
4. measuring and cutting the poly tubing for spacing
5. bending the cable straps into loops around the rods at appropriate connection points creating a hinge
6. marking the tablets for pre-drilling
7. drilling and screwing the cable straps to the tablets

While the process does seem labour intensive, a rig could be constructed with which the tablets could be easily pre-drilled, and spacers could be machine cut to exact dimensions quickly. Furthermore, produced in large quantities, custom metal fittings could be produced economically to avoid the labour of bending the straps by hand. These additional strategies would allow for a greater precision and efficiency in assembly.



above right: steel rod with bent cable strap fittings creating hinge, poly tubing spacer allows for non-horizontal edges

below right: two finished connections. the larger 1/2" E.M.T. straps are placed towards the spacer and face away from the center of the tablet... the result is that the connection emphasizes the hinging action. The smaller 1-RP straps pull the rod very tight to the tablet, creating a rigid connection. This is important as it ensures that the the hinges are not too loose.



buchanan lecture hall mdf tablets

here, the pivot rods were all placed on one side creating a somewhat busy order on one side, while leaving the other side more simple. an alternative possibility is to alternate the rods on either side of the screen, making both sides the same, and spreading out the busy-ness...

the arrangement of tablets is directional, and alternating surface treatments of the tops and bottoms of the tablets occur on each side. The bottoms of the could be finished in a contrasting color to emphasize a difference in surface treatment.



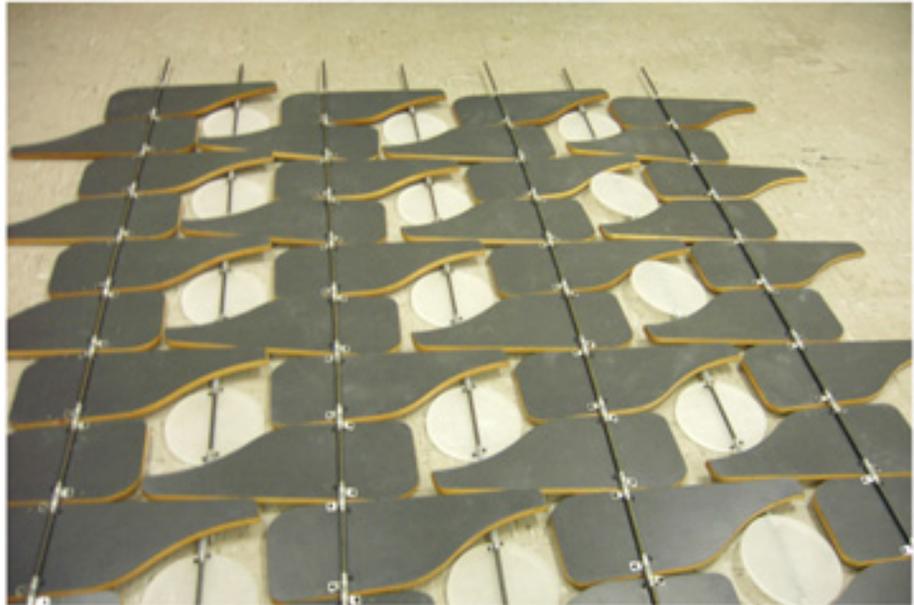




birch tablets

this tablet posed a particular challenge caused by the difference in subtle inside curvature vs. the highly angular outside curvature.

the solution was to create an arrangement by which 8" gaps were left between facing inside curvatures. these gaps were then filled by 8" diameter, 1/2" thick, sand-blasted fibre-glass discs which would partially fill the void spaces while allowing a diffuse light to filter through... the fibreglass discs were cut using the cnc machine from salvaged fibreglass doors that were recovered from the SERF scrap piles.







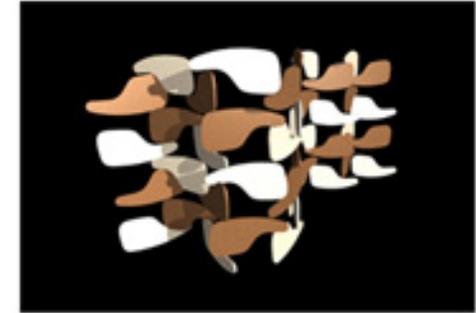
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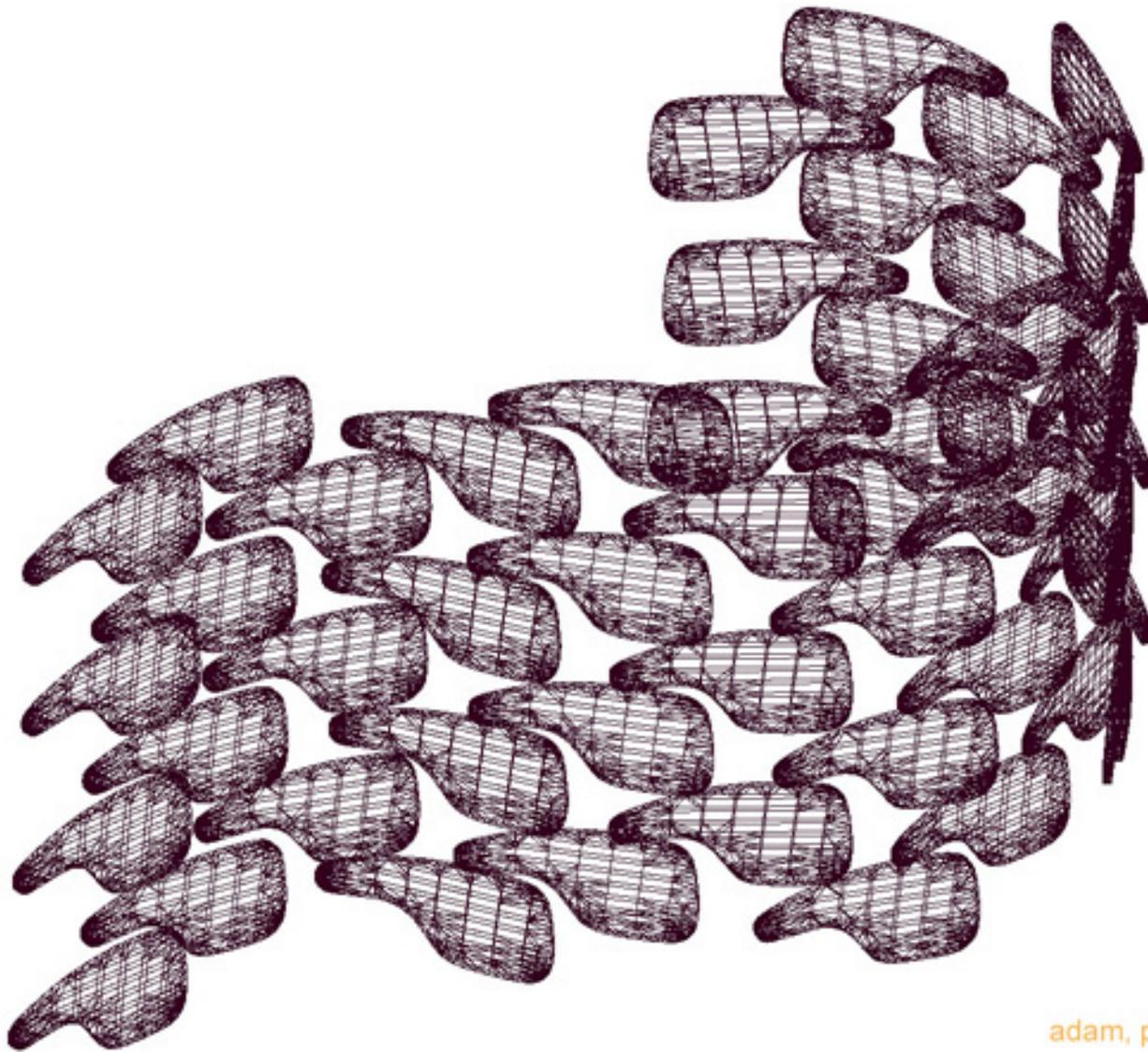
while our investigations in the reuse of discarded materials serves as a useful intellectual exercise for the participants, what is needed is a an ongoing drive to produce real change.

on the one hand, if one of the proposals were to lead to direct implementation, this would not only serve as a single sustainable act, but would serve to provide an example for alternative ways of living- a functional political work of art.

on the other hand, the exercise itself can have as much impact if it were to attract enough attention to make people think.

at the moment, what we have are simply our own personal explorations. what is needed is a forum by which the exercise can be heard by a wider public. furthermore, the exercise should not end here, but continue as an ongoing imperative from term to term.





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sources:

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