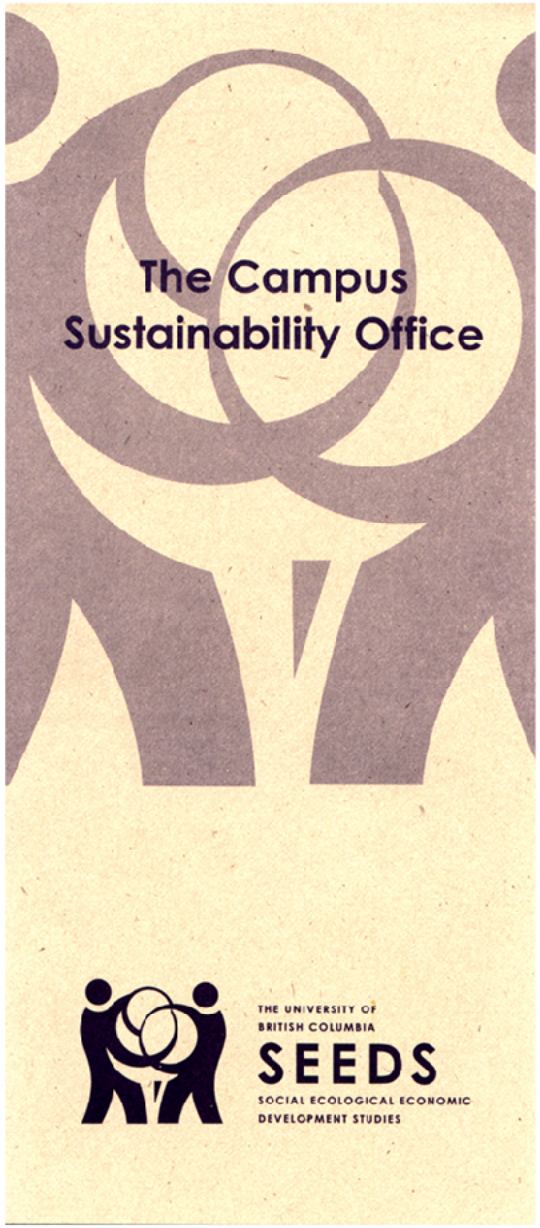
"SEEDS" Chair Project Directed Study

Martin Peter

Spring Term 2002

Instructors: Chris MacDonald and Nicholas Scott



14/01/2002/10:48am

I met with Chris MacDonald on Friday and was given the go-ahead for a semi-independent study course aimed at finding new uses/configurations for seating being removed from UBC lecture halls as a result of building code changes.

The UBC Seeds project has identified 3 types of seats that they would like us to look at. You would be free to deconstruct/reconstruct them. The object would be to come up with viable uses for them, probably as, but not limited to, limited production seating designs - (the School does have an interest in coming up with new seating for the third floor and it would be nice to have an "in house" design). Chris will try to find a way to access the Plant Ops workshops or services for processes (like welding) that we can't do here.
We are setting up a meeting with the Seeds coordinator to start the course off. I anticipate 2 or 3 pin-ups with the other students, otherwise you would be working on your own (or in groups if you wish). Chris has suggested that you each find a design faculty mentor who you could work with for the design aspects and who would be available for the pin-ups. I will make myself available to everyone for technical (and design) advice but I am less experienced in the area of formal design. I will let you know as soon as the initial meeting is scheduled.

Nicholas Scott
Technician

15/02/2002/11:01AM

Martin,

We have been given the go ahead to remove chairs from Henry Angus on Tuesday at 1:30 (rm 110) and 3:30 (rm 104). I'd appreciate it if you could give me some help.

Nick

The chairs in question are typical wood and metal lecture hall seats identical to those found in room 105 of the Lasserre building. Since they appear to be original in this setting, this would date them from 1960-62. The plywood seat and back portions are high quality formed maple with no imperfections. The seat is 7/8" thick 11 ply and the back is 1/2" thick 7 ply and the writing tablet is 3/4" mdf

covered with a laminate. The metal portions are stamped, formed and welded steel pieces which comprise the base and connecting parts between the seat, the back-rest and the tablet. The UBC campus will be replacing many of these original fixed wood and metal lecture hall seats with new cloth covered theatre-style seats which conform with current *fire code* regulations.

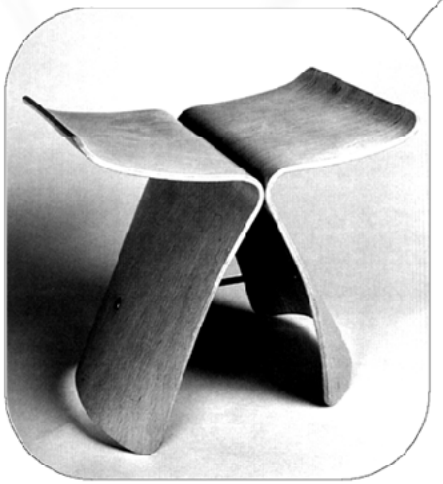
This will result in the availability of literally hundreds of these seats, which will be given to SERF, the campus equipment recycling facility, in order to attempt to realize some *economic* return. Presumably, an individual will purchase some or all of these seats or parts of them for re-use. The metals parts are easily recycled from a commercial point of view, but the wooden parts would perhaps not find a ready market and there would be the threat that they could find their way into the landfill. Part of the SEEDS mandate is to engage student resources on campus to come up with creative re-use solutions for such obsolete equipment.

My initial approach to this task was to explore solutions based on *economic* concerns ("economic" is is the third word in SEEDS); in other words, how could the parts of these chairs be reused or reconfigured on a cost effective basis. Admittedly, this is a somewhat myopic approach, but it is an approach which is based on a rigour which has merit. From this point of view, it was decided that the reuse of the metal portions was not essential - they could be readily recycleable, but the wooden portions not so. However, the wooden parts are constructed of a high quality material with a high level of aesthetic appeal. Another asset is the feature of their curved form, which suggests a relationship with the human body. This lead to an early idea of using the seat to make clothes hangers which ultimately mimic the human body form. The curved form of the seat rest also brought back childhood memories of handheld windmill toys and this was developed by modelling a large scale wind generator which would be mounted on building rooftops on campus to generate electricity - this would address the *ecological* concerns of SEEDS. Ultimately, it was felt that the wooden parts should be reconfigured to form a sitting device, but since the hard wooden seats do not suggest long term comfort, this directed development towards a stool. A stool is a very basic kind of sitting device which is usually made with an *economy* of means to produce an object which provides a very particular type of function; namely, to facilitate short term sitting tasks such as dressing, tieing ones shoe-laces or waiting for someone.

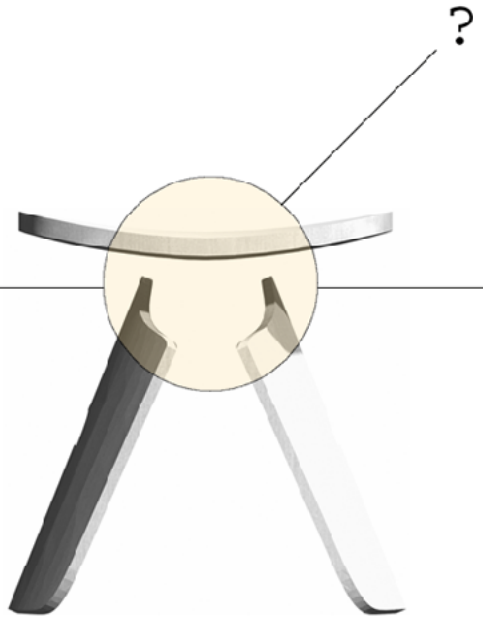
A stool which I have always admired was the *Butterfly* by Sori Yanagi that he designed in 1956. It is remarkable for its beauty and simplicity and has remained in production since it was designed. This stool served as a precedent and starting point of my design which took the basic structure of having the two angled, former seat backs support the seat itself. Thus, the only other component required would be an ingeneous connecting device which would tie all the parts together. At this point the exercise shifted to designing this particular connection in order for it to provide elegance, stability and economy.

Initial investigations into developing a form from cast aluminum lead to technical and production concerns that were assuaged somewhat by switching the production method to *water jet* cut sheet aluminum and simplifying the component. However, I was still not entirely convinced of either the material or the process and after a visit to Professor Mohamed Gadala's engineering office the tack changed toward a simpler fabricated steel connector which could be locally produced.

The dismantled wooden parts would be stripped of their original finish, their shape cut by a CNC machine using a 3D model to guide the cutting bit, sanded, cleaned and then sprayed with a new coat of clear lacquer or polyurethane. The steel connector would be fabricated in a local machine shop, cleaned and then chrome or nickel plated. Alternatively, the connector could be manufactured from stainless steel or be powder-coat painted. Finally, the components would be quickly and easily assembled using simple fastening devices.



Butterfly, 1956 Sori Yanagi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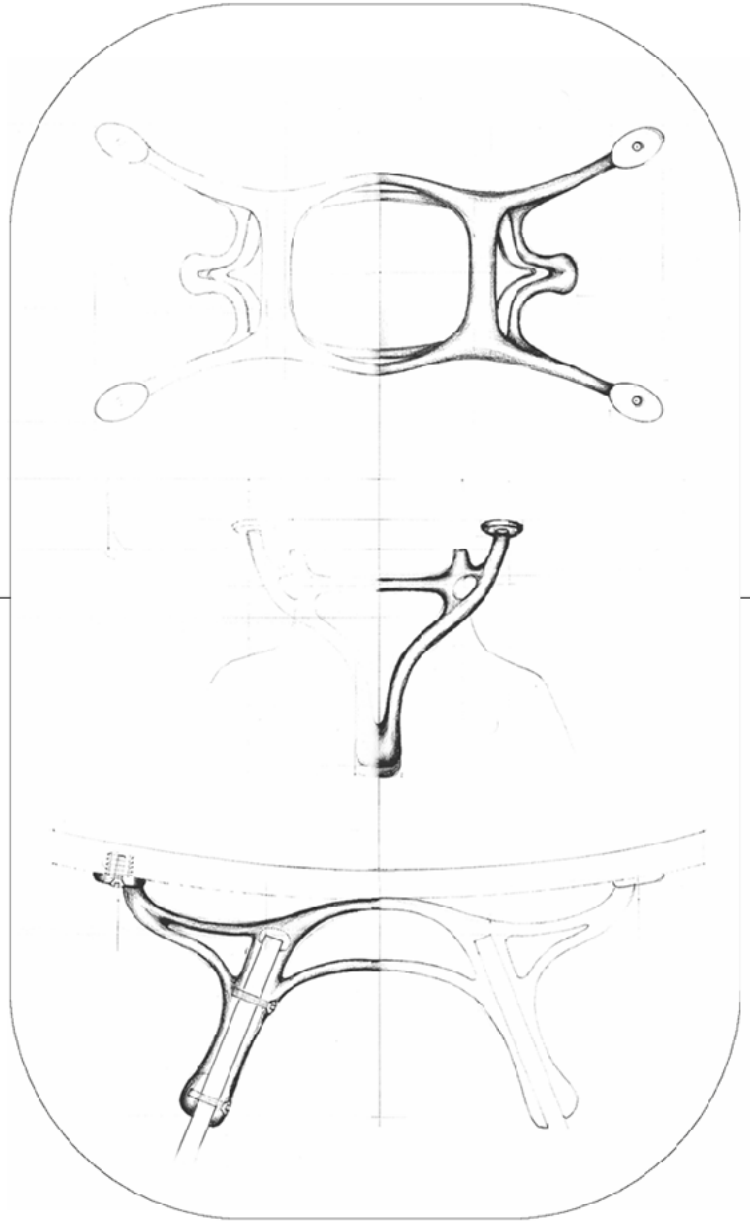

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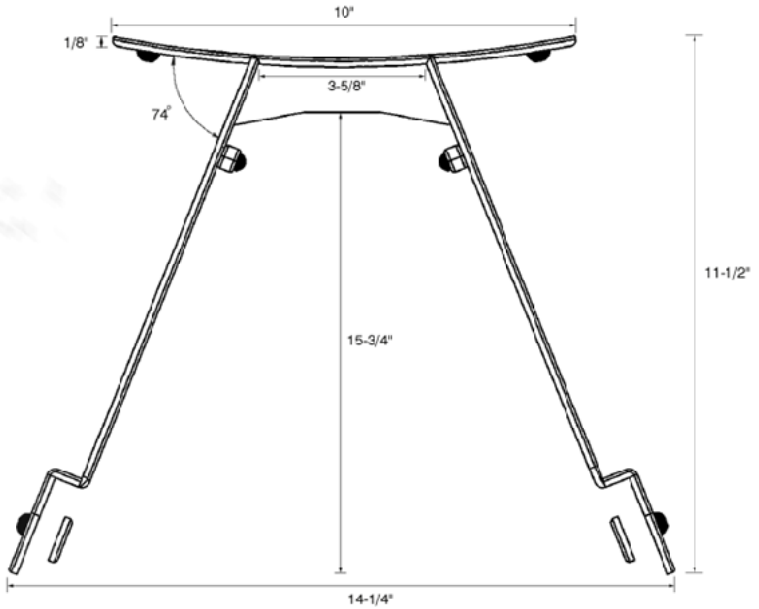

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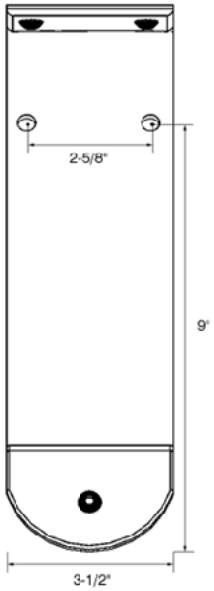

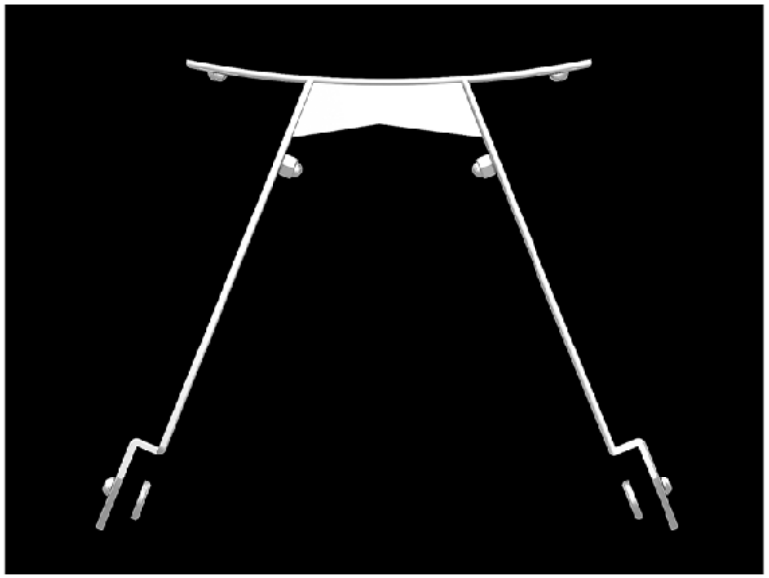

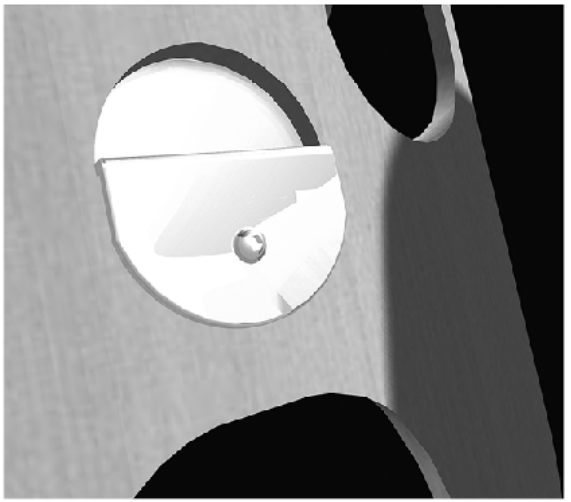

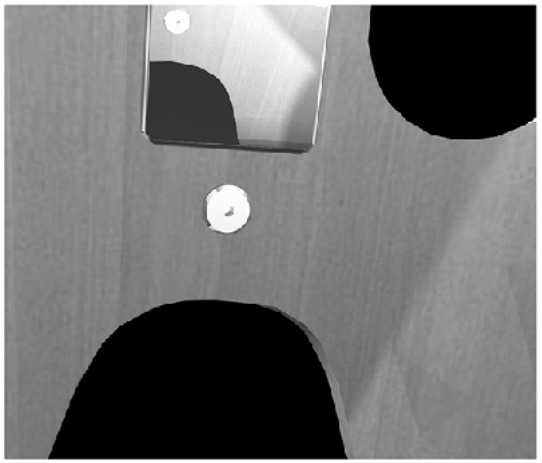

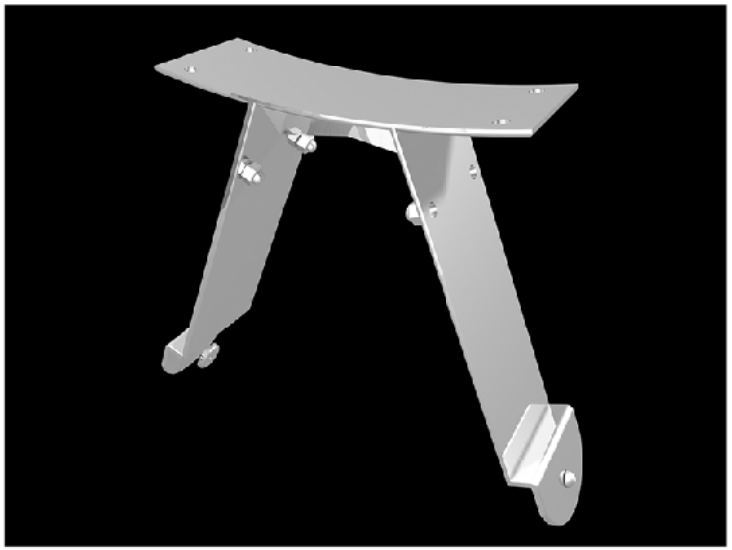

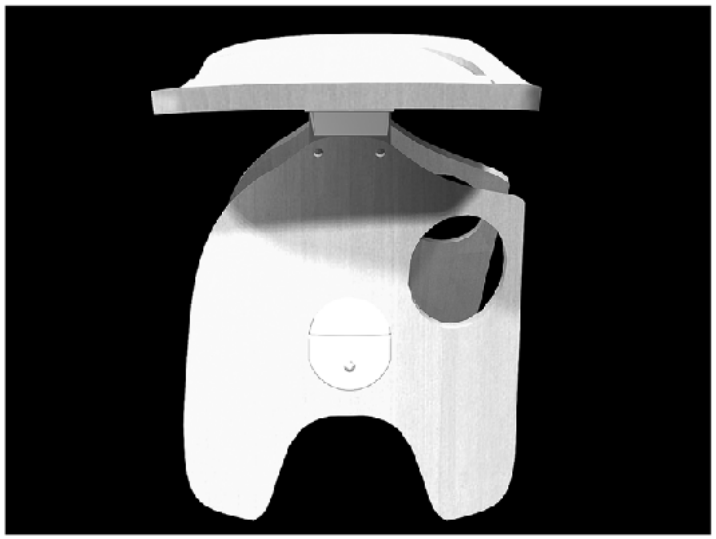

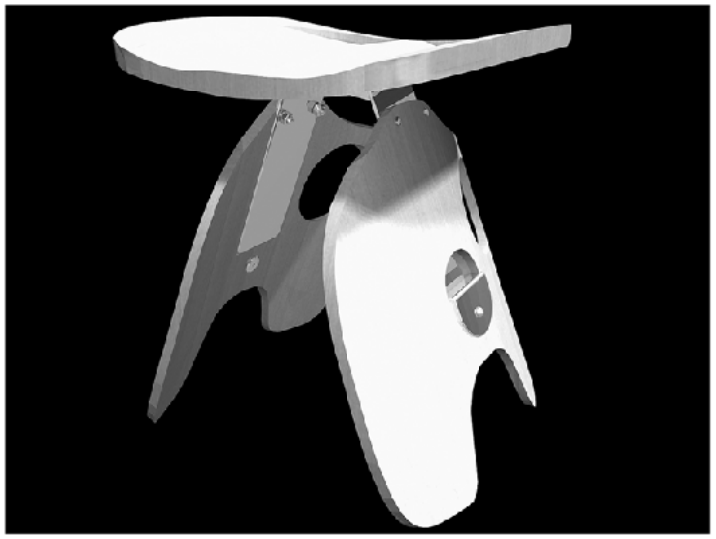

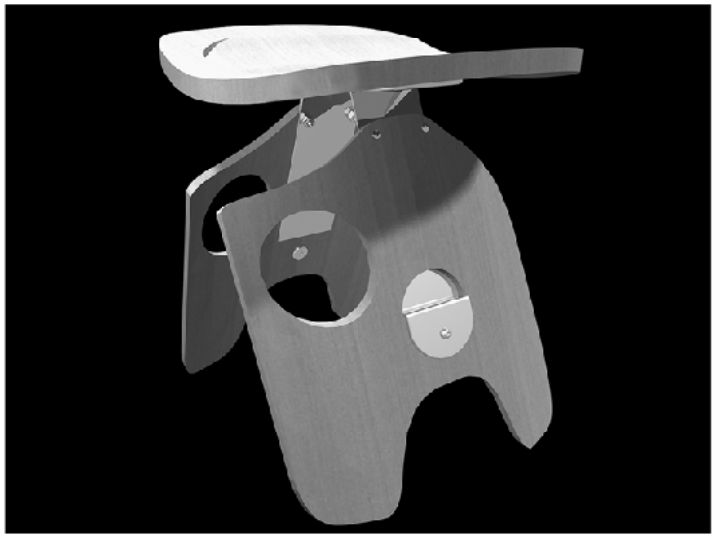

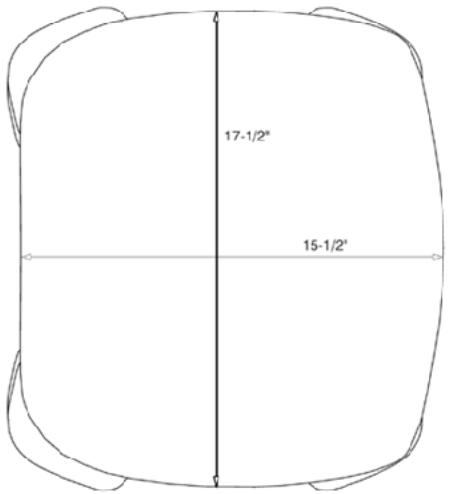

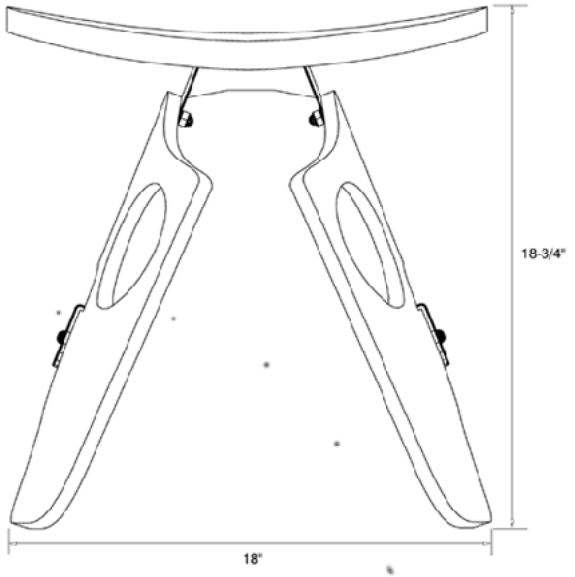

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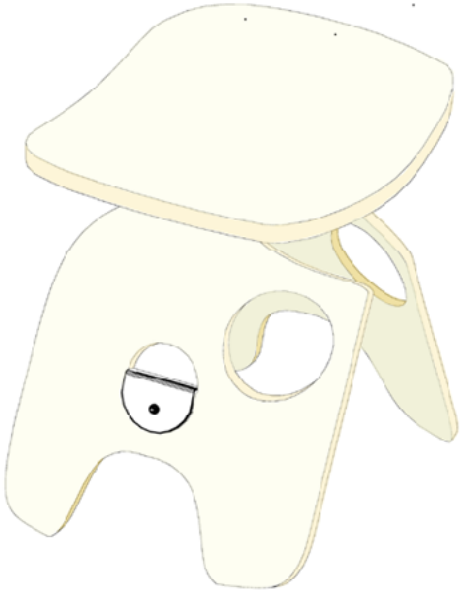
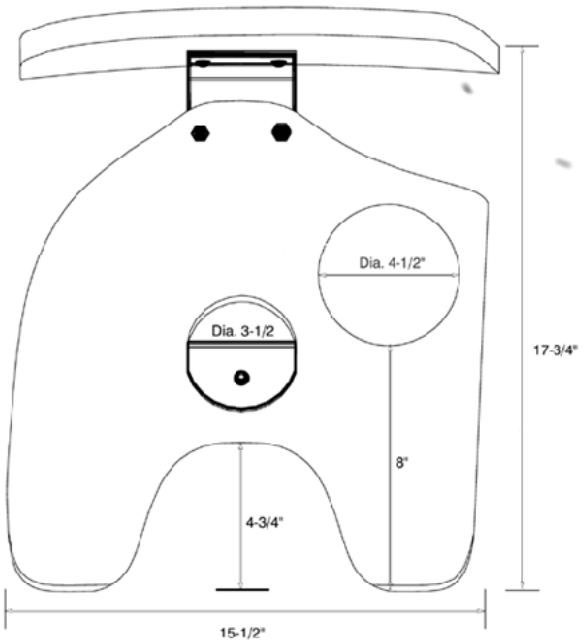
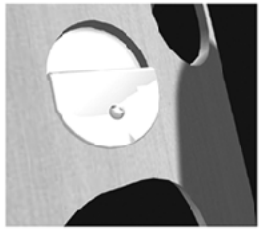
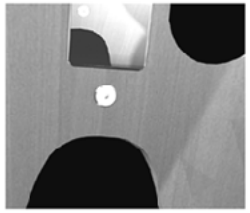




TASK:	TIME:	COST:
1) Dismantle existing chair (x2) -drill out rivets holding seat back and remove screws on base, seat and tablet	10 minutes/chair x2 = 20 minutes	$5.00 (Based on a wage of $15/hour)
2) Remove existing finish (x3) -chemical stripper to manually remove finish -an alternative is to commercially strip components	15 minutes/piece x3 = 45 minutes	$11.25
3) Sand components w/orbital sander -this removes traces of finish and smoothes imperfections and edges	7 minutes/piece x3 = 21 minutes	$5.25
4) Profile bottom edge of seat w/router -router fitted with a suitable cove or 45 degree champfer bit with guide bearing	5 minutes/piece x1 = 5 minutes	$1.25
5) Cut existing seat backs on CNC machine (x2) -Cutting on backs only - contour cutting seat depression considered separately	30 minutes/piece x2 = 1 hour	$15.00
6) Fabricate steel connector (Machine Shop) -expertise and equipment requires that this be fabricated in a local machine shop	Estimated @ 4 hours	@ $35/hour = $140
7) Finish coat or plate steel connector -this step to be completed at a paint or metal-plating shop	Flat rate	$40
8) Final sanding of all wooden parts -this prepares the surfaces for the final finish	12 minutes/piece x3 = 36 minutes	$9.00
9) Finish coat of lacquer on wooden parts -should be done in a paint spray booth, or could be done with a brush although not as smooth	15 minutes/piece x3 = 45 minutes	$11.25
10) Final assembly of all components -components are assembled and fixed together with a combination of wood screws and nut and bolt fasteners (preferably stainless)	12 minutes	$3.00
TOTAL	**8 hours**	**$241.00**





The figure of $241.00 represents labour costs which does not include material costs. These would include such things as sandpaper, chemical stripper, flat stock steel, lacquer and fasteners. When material costs are factored into the equation, the conservative total would be in the neighbourhood of **$260.00**.

It is evident that the cost of materials is only a fraction of the true cost of the stool which is mainly due to labour. Economies of scale could of course lower the final cost - enquiries were made at a local metal stamping and forming shop and it was ascertained that it would cost $1500.00 to manufacture a tool and die to stamp the legs of the connector piece. These stamped legs would still have to be drilled and welded together with the yoke and gusset to form the final piece. This tool and die would only make sense for a production of greater than 25 stools.

With the cost of manufacture in the region of $250.00, this stool faces stiff competition from a host of other similar, less expensive items on the marketplace (for example: IKEA). In comparison, the original *Butterfly* stool is available for US$375.00 (Can$600.00) from the Museum of Modern Art Store in San Francisco. Raw economics of course do not govern the decision to purchase an item such as the Butterfly stool - there is of course the aesthetic appreciation of a design coupled with a sense of exclusivity.

Factored in to the economics of the production of this proposed stool is the utilization and recycling of potential waste material. Perhaps products made from recycled materials such as these lecture seats should be judged on a slightly different scale than ordinary consumer goods. This of course is an ethical and societal question which Europeans have struggled with for some time and North Americans are just now beginning to ask themselves. In a raw sense, a stool or product such as this would have much of its merits in its recycled pedigree but hopefully also in its quality of design, material and manufacture.