WEBO DASTO

task chair

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intro

My interest in seating, as a designer, comes from the challenge of combining concept with craft, comfort with aesthetics, and expression with structure. Given the utilitarian nature of the chair and our dependence on it as an object of comfort and as a tool for working, the current range of seating options already available is vast. I was not interested in designing an object for mass consumption. My interest was in challenging the current standards and function of seating. Chair designs seem to consistently exist within the constraints that we have come to assume about sitting; that it is a resting point and that movement exists within the ability to adjust the chair's structure.

The Webo Dasto task chair stems from a two year old prototype, my first experiment in suspension seating. It is simple and unresolved, but always receives attention and positive feedback as it sits among a semi-circle of very ordinary furniture in my room. In my continued investigation of my belief that comfort requires freedom of movement, I attempted to create something innovative and practical by addressing seating simply as a structure that supports the body in positions between standing and lying down. Facilitating a range of motion was my constraint.

This project, in many ways, was one of contradictions, negotiating the relationship of the user and object. Can seating allow the user to relax while also helping them concentrate? Can a chair provide adequate support while also allowing effortless movement? The redesign would come from a reassessment of function. By designing for a range of positions and the ability to move through them freely, it is possible to create seating that facilitates movement.

In a day, the average person spends more time sitting than sleeping (Pope, 2012). This is most often a result of the requirements of their work. Allowing the user subtle, controlled movement can make long periods of sitting more bearable, while also helping to eliminate discomfort as a distraction. Since people spend so much of their working time seated, it was necessary for my design to be functional primarily as a task chair. This became the basis for my exploration, that the user must be able to comfortably engage in a physical activity in front of them, i.e. computer work, drawing, reading, or writing.

I was interested in the relationship between comfort and mood, posture and productivity, and how seating affects the way a person experiences their environment. The Webo Dasto task chair project was an exploration of seating that facilitates movement to improve posture and comfort, and promote both concentration and relaxation.

webo dasto
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I began exploring a variety of ways in which to create the desired range of motion. In this case, I knew the final form would be a result of the function, specifically, the way in which the chair facilitates movement. Early ideas included movement through flexion, suspension, resistance as a counterweight, and balance. I started with a prototype that had a separate, but connected seat and back, attached by brackets that allowed them to pivot (F. 1). This created indepedent adjustability in the seat and back to actively accommodate the user's movement. The seat and back were then suspended from a simple steel frame (F. 2). This suspension by steel cable prototype allowed a rocking motion, but limited side-to-side mobility.

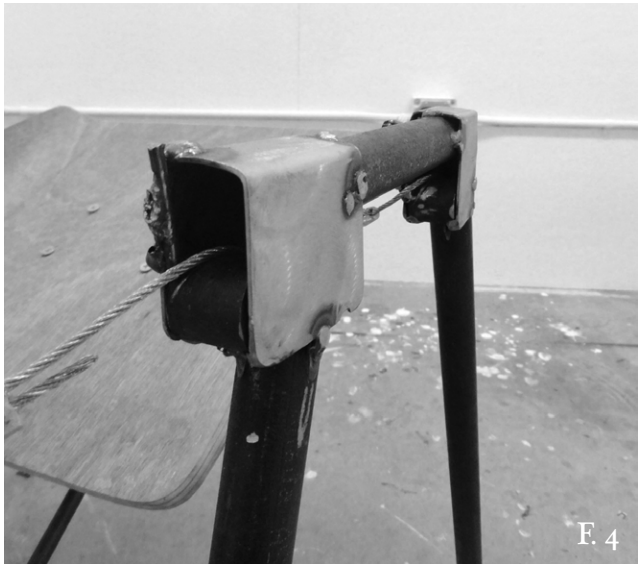
F. 1

F. 2

Taking the suspension experiment further, I added a pulley system, through a new steel frame, to suspend the seat and back, attaching the opposite end of the cable to springs in the legs of the chair. As the user sits, putting weight on the seat and back, the springs extend, creating resistance to act as a counterweight to relieve pressure on the user (F. 3 & 4).

These initial experiments, however, seemed more suitable for use in a lounge chair, as they tended to push the user towards the reclined position. In order to create a range of motion that was multi-directional and accommodating of the necessary forward, upright, and reclined positions, I wanted to give the user more control. I wanted to explore use of the chair's base to create a range of motion, allowing people of different sizes and weights to experience the movement in the same way.

F. 3



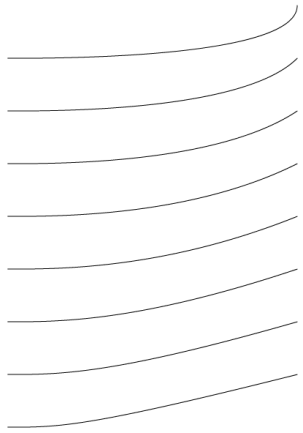
F. 4

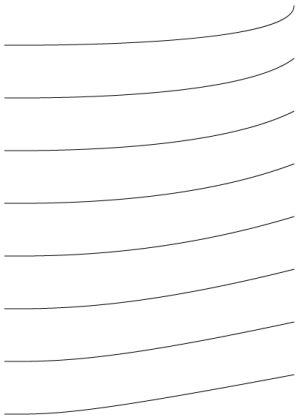
Customization of the typical task chair is limited to adjustments of the chair's structure, whether it is the arm rests, seat height, or back height. Shifting the point of adjustability from the chair itself to its contact point with the floor offers the user a more free and specific customization by utilizing an open range. The challenge would be in creating this awareness of posture in the user without also creating a distraction.

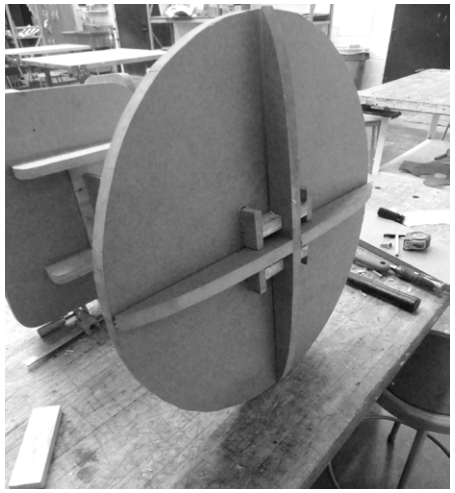
Based on these prototypes, where movement was limited to a back-and-forth swing, I found it was necessary for movement to be possible in all directions in order for the user to reposition themselves more freely. Using the base for muilt-directional movement meant that balance would play a role in the user's physical relationship with the chair. The user would control the position of the chair by shifting their body weight. This adds an additional element of required safety. I found

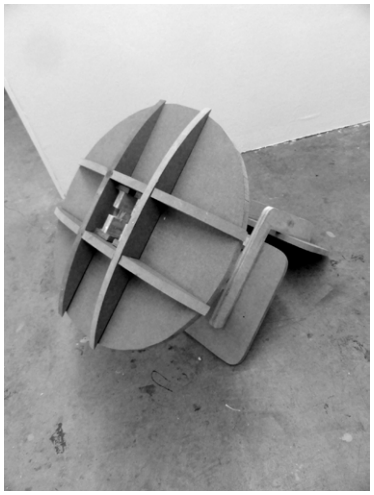
balanced-based movement to be most suitable for achieving a desired range of motion that allows the user the ability to work comfortably and also relax without thinking about making adjustments. However, the range would have to be defined in a way that offers a variety of safely accesible positions.

My primary focus was designing the base to facilitate a comfortable range of movement. Starting from the circular motion created by a shallow, bowl base, I manipulated the curve to add balance points that support the tendencies of task chair users. This allows for forward, upright, and reclined positions with smooth, effortless transitions between them, while also allowing the option of continuous movement. Finding the appropriate base curves would be the key to a succesfful balance-based chair that comfortably offers support and movement.









F. 5

The development of any object must include consideration of the relationship between concept and craft. In this case, the concept is the facilitation of movement in seating, and craft is the realization of this idea through expressive form and durable construction. The challenge existed in presenting the concept in a way that allows the user to develop an attachment to the object beyond its function. The intentions of this project, to eliminate the chair as a distraction, also included aesthetics. It had to be simple and unobtrusive.

I am hoping to have designed an object that demands attention for its expression of a playful side of professionalism. I wanted to create an expression of specific function through the form, as if to say, "This is the chair of the future; how it looks, how it works, and eventually, how it changes behavior." By highlighting the circular base and draping curves as a reference to Eero Saarinen's *Tulip Chair* (F. 5), I am attempting to integrate a timeless, yet futuristic aesthetic to create consistency in form and function.

The circular base is expressive of continuity and movement, which attempts to communicate visually the user's sitting experience.

> "If there are now fewer material and manufacturing problems to solve in the general arena of furniture and lighting design then we must find forms of expression where structure and material resolution are taken as given and the designed object as cultural information can be contemplated. Invention now lies more in reconnecting and building authentic, narrative layers of meaning back into objects that have lost meaningful significance..." (Ball & Naylor, 2005)

This excerpt from *Form Follows Idea* supports a shift in design culture away from repetitious minimalism, for the sake of narrative value. Applying this idea to the Webo Dasto, I understood that efficient material usage and production methods were a requirement, but not the primary concern. In a culture saturated by consumption, the role of a designer is to take responsibility for the choices and behaviors of consumers through decisions in the design process that are conscious of product impact and life cycle. Contemporary design demands awareness of waste.

How do I create an object that has potential for mass production, but also occupies a responsible place in consumer culture? How does an object lend itself to the creation of a narrative? And what role does material play?

Approaching this exploration of seating, I had unintentionally made certain assumptions about the finished product. There were certain things I knew were required of the end product. It had to embrace the user's tendency and preference of readjustment. It had to be clean, but not trendy. And it had to be an object that people would learn to care for, or at least not immediately become an inevitable throwaway. I knew material use would be a critical factor in how people perceived the chairs' life cycle. Based on my own experiences, I had come to assume plastic, especially as a primary material in seating, felt cheap. I had also been working primarily with wood and lamination leading up to this project. This lead me to believe the final product needed to be wood (and probably something Eames inspired) if it were going to fulfill my requirements of not being trendy and temporary. I would discover, however, that craftsmanship and consistency can defeat material associations. I would also discover that material follows form follows function might be the right methodology for accomplishing my intentions.

It was research from one of today's prominent seating manufacturers, Herman Miller, that reinforced my belief that the chair must be accommodating of the three primary positions of a task chair user: described as forward, slightly reclined, and deeply reclined (Chadwick, Dowell, & Stumpf, 2007). I accepted this as the necessary range of positions I was designing for, with special attention to the forward, working position. People use an upright to forward posture 75 percent of the time while doing computer related tasks (Dowell, Green, & Yuan, 2001).

As an additional source of reference I looked to the work of Peter Opsvik, a designer of seating with attention to movement for over fifty years. Opsvik has developed theories surrounding seating that have informed my design decisions regarding balance and the need for repositioning. He states that it is important to consider all seating as potential workstations,

Reflex 3
2009
by Opsvik

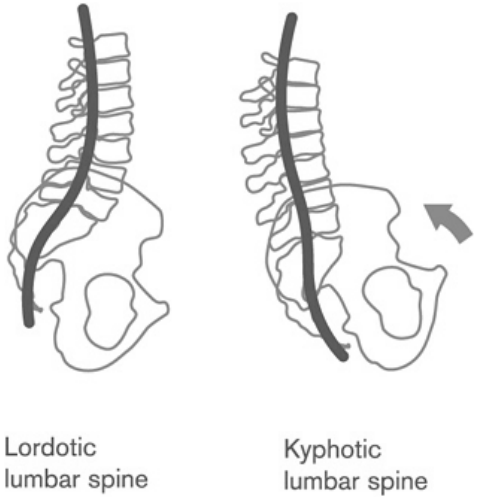
Pendulum 1983 (above)
Supporter 1983 (left)
by Opsvik

and that we must be designing to allow our bodies to respond to our natural tendencies and preference of movement and adjustment over remaining static (Opsvik.no).

I attempted to integrate the findings of leading seating designers with my own observations and issues surrounding seating. This includes noting the contrast in behavior promoted by seating compared to behavior while standing and walking. There is considerable discomfort in shifting one's weight while sitting compared to the ease of doing so when standing or walking. Even when sleeping, the human body requires repositioning. In combining my own experiences with the work of other designers, it became especially important to remember I must design beyond my own preferences, and that the human body is one of the variables that must be accommodated in a way that is considerate of extremes.

> "We like to think that we design for ourselves, and we do. But in the important ways we are really very much like a lot of other people. And if you are going to design for yourself, then you have to make sure that you design deeply for yourself because otherwise you are just designing for your eccentricities and that is where you are different."
>
> -Charles Eames

The human body itself poses significant restraints. In order to allow the user movement, it was important to pinpoint how this movement would be initiated and controlled by the user. Balance is a starting point for movement (Opsvik.no). Balance engages the user in a way that promotes self-awareness of posture, one of the most important tools in developing good habits (Hermanmiller.com). Seating that places the user's feet on the floor in front of them gives the user control over movement. This movement, initiated by the planted feet, improves circulation (Schoberth, 1978). Thus, an understanding



F. 6

of posture and how it is affected by seating was required to create the desired experience. The focus of creating movement in the chair was movement of the pelvis. The pelvis controls the shape of the spine since the lower (lumbar) spine is attached to the pelvis at the tailbone (sacrum) (Schoberth, 1970).

When standing, the lumbar spine has a natural inward curve. While sitting, the pelvis has a tendency to rotate backwards from its natural alignment. This creates a kyphotic curve in the lumbar spine: a straightening or outward curvature that causes discomfort (Andersson et al., 1979). (F. 6)

By supporting the pelvis in a way that keeps it from rotating backwards, it is possible to improve posture over long

periods of sitting. This is more consistently accomplished in chairs where the relationship of the seat and back does not change (Chadwick et al., 2007). Attempts to correct this pelvic rotation have focused on the use of increased lumbar support and the use of wedges in the rear of the seat. However, variation in the size and support requirements of users' lumbar spine prevents additional lumbar support from providing a comfortable solution to all users (Dowell, Stumpf, & Walker, 2003). Additionally, wedges can create discomfort through over-rotation of the pelvis, forcing an extreme lordotic/inward curve that must be compensated for by the upper spine (Rosse and Gaddum-Rosse, 1997).

F. 7

F. 8

There are several contemporary designers that have explored the use of a base that requires balance, specifically Thomas Heatherwick (F. 7) and Moritz Marder (F. 8). However, their chairs do not accommodate the full range of common sitting positions and are not suitable as task chairs.

My design addresses this problem by creating balancing points in the range of motion to force the user's pelvis into the proper position while reclined, upright, and forward. By using movement and balance to engage the pelvis, the user is discouraged from slumping into the chair.

With evolution towards an increasingly more sedentary lifestyle over the past century, I find it necessary to challenge our expectations of seating. The consequences of poor posture as a result of bad chairs and prolonged periods of sitting are apparent and distracting. This project addresses the function of seating and its ability to influence our behavior. By embracing the body's need for repositioning and adjustment while also recognizing the shortcomings of existing chairs, I am challenging our standards of seating. Even an adjustable chair excludes some percentage of users from comfort. To create task chairs that function differently from the seating we are accustomed to, I designed seating to facilitate movement. By allowing adjustment through a range of motion built into the chair, users are given full control over their posture.


WEBO
DASTO
task chair

references

Ball and Naylor (2005), "Form Follows Idea," Black Dog Publishing.

Chadwick, Dowell, and Stumpf (2007), "Kinematics of Sitting," Herman Miller. Available at: http://www.hermanmiller.com/hm/content/research_summaries/wp_Kinematics_of_Sitting.pdf

Dowell, Green, and Yuan (2001), "Office Seating Behaviors: An Investigation of Posture, Task, and Job Type," Proceedings of the Human Factors and Ergonomics Society 45th Annual Meeting.

Dowell, Stumpf, Walker (2003), "The Benefit of Pelvic Stabilization: Ergonomic Criteria for Design of the Aeron Chair," Herman Miller. Available at: http://www.hermanmiller.com/content/dam/hermanmiller/documents/solution_essays/se_The_Benefit_of_Pelvic_Stabilization.pdf

Hermanmiller.com (no direct link)

Opsvik.no, "Sitting Philosophy," Peter Opsvik. Available at: http://opsvik.no/reflections/sitting-philosophy

Pope (2012), "Sitting: Hazardous to Your Health," AARP. Available at: http://www.aarp.org/health/fitness/info-03-2011/sitting-too-much-health-hazard.html

Rosse and Gaddum-Rosse (1997), Hollinshead's Textbook of Anatomy, Fifth Edition.

Schoberth (1970), "Correct workplace sitting, scientific studies, results and solutions," Der Arbeitssitz in Industriellen Produktionsbereich.

Schoberth (1978), "Vom richtigen sitzen am arbeitsplatz," University of Frankfurt, Ostsee Clinic.