Ambiguous walls –
Reflections on responsive luminous textile surfaces

Astrid Mody

The Royal Danish Academy of Fine Arts, Schools of Architecture, Design and Conservation and Philips Research (The Netherlands)

Philip de Langes Allé 10

DK - 1435 Copenhagen K

astrid.mody@kadk.dk, astrid.mody@philips.com

ABSTRACT

The introduction of Light Emitting Diodes (LEDs) in the built environment has encouraged myriad applications, often embedded in surfaces as an integrated part of the architecture. Thus the wall as responsive luminous skin is becoming, if not common, at least familiar.

Taking into account how walls have encouraged architectural thinking of enclosure, materiality, construction and inhabitation in architectural history, the paper's aim is to define new directions for the integration of LEDs in walls, challenging the thinking of inhabitation and program. This paper introduces the notion of "ambiguous walls" as a more "critical" approach to design [1]. The concept of ambiguous walls refers to the diffuse status a lumious and possibly responsive wall will have. Instead of confining it can open up. Instead of having a static appearance, it becomes a context over time. Instead of being hard and flat, "ambiguous walls" combine softness, tectonics and three-dimensionality.

The paper considers a selection of luminious surfaces and reflects on the extent of their ambiguous qualities. Initial ideas for new directions for the wall will be essayed through the discussion.

Author Keywords

Architecture, Light-Emitting Diode, textiles, responsiveness.

INTRODUCTION

In architecture we see various integrations of responsive luminous walls (cf., Simone Giostra & Partners (2008) *GreenPix - Zero* Energy Media Wall [2], Jason Bruges Studio (2005) *Memory Wall* [3]*,* James Carpenter Design Associates Inc. (2006) *Podium Light Wall* [4]). Generally, however, these notions of walls comprise three elements: the wall as a luminous skin, responsiveness to outer stimuli such as sunlight and user-responsiveness. Nevertheless, when analysing how architectural walls have challenged architectural thinking of enclosure, materiality, construction and inhabitation (cf., Gottfried Semper (1851) P*rinciple of Dressing* [5]*,* Mies van der Rohe (1929) *Principle of Floating Room*, *Barcelon Pavilion* [6]*,* Kennedy (2001) *The Material Culture of the Hollow Wall* in *Material Misuse* [7])*,* this may inspire and encourage architects to explore these "forgotten functions" of walls as well as other potential functions through the notion of ambiguity and the combination of light and textile. When LED "[t]echnology is developing as rapidly as it is now, reflection and criticism are particularly important" [8]. It is necessary to push what is conceivable by improving our knowledge of the subject matter and developing new possibilities. Dunne and Raby propose a "critical" approach to design, both offering an ambiguous perspective thereon and challenging industrial agendas. Their approach is based on what Martin Amis called "Complicated pleasure" [9].

According to Amis, design should provide an ambiguity that involves the user in a narrative rather than dictating a generic use. This is often achieved through design which combines realistic technologies with fictional, social and cultural values. The aim is to encourage the user and other designers to reflect on social and cultural mechanisms that define what is real or fictional. The design is defined as "complicated" and the imagined scenarios can be worrying or playful, inspiring a range of emotions.

Following Amis's approach, Dunne and Raby introduce the term "Material Tales*". Material Tales "*function as conceptual testpieces, that though their strangeness, make visible some of the social and psychological mechanisms that shape aesthetic experiences of everyday life mediated by electronic products" [10]. As their usability are often unclear, the user must imagine a scenario use. Thus he/she realizes alternative conditions to the predominant notions of their usability.

The question remains, however, how can architects and designers be "critical" in their approach to responsive luminous walls? Is the notion of ambiguity potentially useful in the design of walls? Which social and cultural

values could be discussed? How could this notion of an "ambiguous wall" challenge relations between materiality, immateriality (light/electromagnetic energy), user and space (responsiveness)? Could the materiality of textile become a mediator in between technology and the user? And, finally, could the concept of the "Electrical Fairy" [11] provide insights?

This paper investigates the concept of "ambiguous walls" as a heuristic method towards new and more critical approaches to responsive luminous surfaces. The concept refers to the diffuse status a lumious and possibly responsive wall will have. Instead of confining it can open up. Instead of having a static appearance, it becomes a context over time. Instead of being hard and flat, "ambiguous walls" combine softness, tectonics and three-dimensionality.

Seven different cases are discussed in four sections. Each section starts with analysing the cases' ambiguous qualities in regard to a specific light focus and concludes with suggesting approaches to the design of "ambiguous walls".

CONTEXT OF AMBIGUOUS WALLS

Light transforming space

According to Dunne and Raby Toyo Itos *Tower of Winds* "links the material and immaterial" to initiate "aesthetic and conceptual possibilities" [12]. The tower materializes Tokyo's never-ceasing, ever-changing wind into light. A place specific climate condition is converted to a poetic experience, while offering the user space to reflect on the ambiguity of emotions connected to climate and technology. The tower's transparency alters according to its changing external stimuli, from a solid appearance to a layered space to a transparent skin. Dunne and Raby use the phenomena to discuss atmospheric or "hertzian spaces"—the ambiguity of "metaphysical aspects of electricity and magnetism" [13]. Following on the notion of "hertzian spaces" one might consider the implications not only on the scale of the city (*Tower of Winds*) but on the domestic scale also. According to the concept of ambiguous walls one could imagine a textile cavity wall, which converts the inhabitation of air, water and electricity to a poetic experience, initiating discussions of energy use and sustainability. The cavity wall might be an interesting typology to explore this notion, as *"… for the first time, the wall not only divides spaces, but also contains it"* [14]. Kennedy suggests further, that the cavity wall *"gains a different quality of corporeality through its hollowness "* ... as it is ... *"inhabited by water, air, electricity and information"* [15]. The wall "could provide new experiences of everyday life, new poetic dimensions" [16]. This condition of architecture being more than function is backed up by Grosz, saying: "it [architecture] is also always about … sociality, a cultural excess that needs elevation, not diminution" [17].

As the cavity wall, *"... connects sites of consumption and production separated by social and economic distinctions of class and race"* [18], could the cavity wall evolve as a mediator of social values? Rather than separating spaces, ambiguous walls could establish spatial links in between physical places inspired by the contiguity of services. And rather than opposing infrastructure and materiality, materiality and infrastructure could be merged in dynamic luminous systems of the wall.

Figure 1-3. Toyo Ito *Tower of Winds* (1986): From solid appearance, to layered space to transparent skin.

Light mediating space and technology

Sheila Kennedy's project *Zip Room* proposes textiles as mediator for technology. In the design of the *Zip Room* incorporeal technology is combined with textile materiality, encouraging touch and pliability. According to Kennedy the *Zip Room* is "both materially specific and complex; the fabric surface is dynamic, becoming tactile, sheer, translucent, and light-reflective to different conditions of use" [19]. The design suggests a wall without distribution conduits and fixtures, transforming the surface of the wall into a three-dimensional space.

In Daniel Rybakken's installation *Daylight Entrance* (2010) [20] the positive sensation of daylight is converted to artificial light zones on a wall of an entrance area in an office building without sunlight, offering the visitor an ambiguity of a "hidden window".

Thus, synthesizing on these two examples by Kennedy and Rybakken, the concept of "ambiguous walls" could push the idea of a separating textile walls in a domestic context, which map and harvest energy of the varying light zones or shadows of objects projected on the wall during the day and convert them to staged, changing luminous patterns at night-time; the suggestion is of a textile wall not only a non-structural spatial divider ("*Principle of Dressing"*) but a material mediation between a solid two-dimensional surface and the spatial qualities of light. A wall as a communication tool to familiarize LED, similar to the phenomena of the "Electrical Fairy", which was used in advertisements to introduce future users to electrical technology in the first three decades of the 20th century. According to Sheila Kennedy the fairy "naturalized relationships between power, capital, and electricity, while her literal transparency magically maintained invisibility between producing and consuming segments of society" [21]. "Electricity glamourized … her body while also concealing it: The fairy offered a scalable spectacle" [22]. Connecting this concept with the idea of ambiguous walls, walls could domesticate LED technology and offer realistic scenarios to the user,

combing technology and design. Rather than excluding the user in the appropriation of LED technology, the wall could become a test site for both architects and users.

Figure 4-5. Rybakken, D. *Daylight Entrance* **(2010) and Sheila Kennedy** *Zip Room* **(2006).**

The observer/inhabitant as co-author of the light experience

Jim Campbell's *Low Resolution Works* analyse the concept of ambiguity through looped video sequences translated to LED panels in different set-ups. Campbell investigates how much detail can be removed whilst preserving the overall integrity of the image. In *Reconstruction 7* (2006) [23], for example, LEDs are directed towards the observer but filtered through a thick plexiglas surface. Observed from the front, the image becomes blurred because of the thickness and transparency of the surface. Observed from the side, the light cone of the LED becomes visible. *Church on Fifth Avenue* (2001) [24] negotiates the notion of digital and analogue through a set-up of two surfaces, one projecting the light of LEDs, one receiving the light. As the receiving surfaces are angled away from the wall from left to right, the resolution of the image shifts from low to high, digital to analogue.

Envisioning this approach in the design of ambiguous walls it could challenge the notion that digital technology opposes materiality. One could imagine separating walls, or wall panels, which are perceived differently depending one's position of the inhabitant in space or the relation in between the textile and the LED.
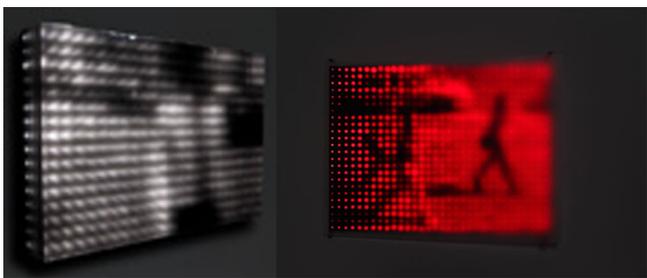

Figure 6-7. James Campbell *Reconstruction 7* **(2006) and** *Church on Fifth Avenue* **(2001).**

Luminous textiles as spatial systems

Philips project *Bio-Light* is an example of a nature inspired technology approach [25]. *Bio-light* is a part of the concept *Microbial Home Probe*, "a domestic ecosystem where each functions output is another's input" [26]. It proposes a wall construction of glass cells containing a live bacterial culture that emits soft green light by bioluminescence. The system is fed by methane and composted material drawn from the methane digester of the *Microbial Home* system to produce a soft green light.

Sheila Kennedy's textile curtains of the project *Soft House* [27] explore spatial and programmatic values of solar textiles in a domestic context. *Soft House* combines photovoltaic technology with textile materiality, proposing a sustainable, pliable curtain integrated in the design of a sky light, which can create space, when folded down, or becomes a luminous chandelier, when folded upward.

Both projects explore the idea of a system, a self-sufficient ecosystem in case of the *Bio-light* concept, and a sustainable energy-light-system in the *Soft House* project. Following on this idea of a system and combining it with the concept of ambiguous walls one could fantasize of mouldable luminous textile surfaces uniting floor, wall, ceiling, curtain and luminaire. Folds, slits or hollows could anticipate or engage interaction with an inhabitant and mediate between filtering, reflecting or shading light during the day. They could also offer myriad possibilities to integrate LEDs into the voluminous surface, camouflaging its one-directionality and creating a more diffuse and varying light – similar to filtered daylight in nature.
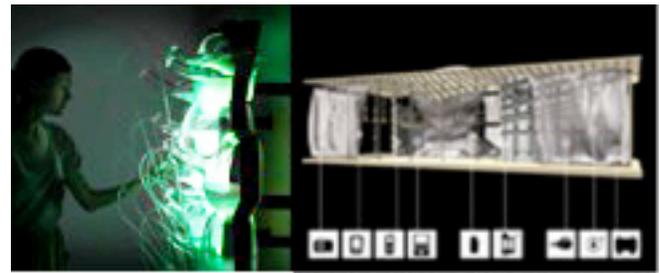

Figure 8-9. Philips *Bio-light* **(2011) and Kennedy, S.** *Soft House* **(2007).**

PERSPECTIVE

This paper unfolds new directions for integrations of LEDs in walls, in particular proposing alternative typologies to the familiar notion of the luminous skin. The paper introduces and discusses the concept of "ambiguous walls" as an - approach, challenging the thinking of inhabitation and program of luminous surfaces. It argues that this concept could increase the engagement of the user with design and that design could influence the acceptance of LED technology in society through a more critical and ambiguous approach—the notion of ambiguous walls.

According to Prof. Dr. Serges Gagnon this process of acceptance through design is defined as "cultural appropriation of technology" [28]. Implicit is the understanding that developments in design and technology are intrinsically related and "it is a way of adopting technology in our culture by accepting its influence as well as influencing it" [29]. Following on Gagnon's claim,

Winter suggests that the influence of technology on design is not one-directional, but rather synthetic [30]. If both designers and future users influence technological developments, how can we, designers, ensure that most desirable futures are realized? Could the concept of "ambiguous walls" energize discussions, innovations and appropriation?

ACKNOWLEDGMENTS

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