

Healthcare Design: The Role of the Roller Shade

By Ben MacKenzie, PE

Overview

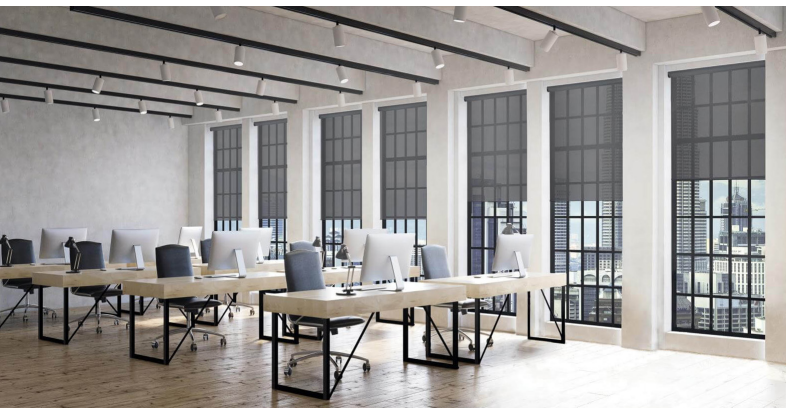
A recent article titled *How Do You Design a Better Hospital? Start With the Light* (Harrison, 2022), prompted me to address the integral role that our intelligent roller shade systems have in the modern healthcare environment, and perhaps equally important – how consistently these systems are under designed. In this post, I will focus on several of the specific criteria that engineered window treatments address specifically relating to one of the key metrics of healthcare facility design: patient comfort. Here we will focus on four points:

1. Overview of an engineered shading system
2. Acoustical considerations of roller shades
3. Visual considerations of roller shades
4. Interior applications of roller shades

Engineered shading system

Owners and architects are constantly searching for innovative technologies to target improved patient comfort, taking a holistic approach to healthcare facility design focusing on automation (to make treatment more effective, less intrusive, etc.), to make patient rooms more private and welcoming (think innate, cleanable finishes, access to natural light, etc.), and other factors too numerous to list here. Motorized roller shades have existed in the modern hospital for many years; however, they are often applied as a one-size-fits-all system that is briefly specified and often treated more as an afterthought rather than a key system in how a patient experiences their space. The fact that they already exist in some form is a critical thought.

As these systems already are present, the cost to implement a properly engineered roller shade system is minor, and most of Veil's projects have tailored these systems to reduce the overall cost through bespoke/thoughtful design. While emerging systems such as electrochromic glass have emerged, slow reaction times, cost, and lobbying issues (Weiss, 2022) have caused our team to be apprehensive with using them as a common solution in place of roller shades on most project. Veil prides itself as a member of the design team focused on window treatment design and control, improving the performance of numerous parts of traditional roller shade design to directly improve the patient experience.



“ A well-designed roller shade system can target one of the hardest surfaces in your space, the curtain wall, and give designers a solution to help improve the acoustical performance of a space and directly affect how a patient perceives noise around them. ”

Acoustical considerations of roller shades

During my years as a professional engineer and in my new role in roller shade design I can decisively state that the acoustical impacts of a roller shade system has never been considered by the design team on a project of my own. This is by no means a slight at these projects' design teams, it is simply a result of the complexity of modern hospitals and how occupied today's design teams have become; there is simply not time for architects and interior designers to focus on the nuances of roller shade system design and specification.

My observation

The acoustical benefits of a roller shade's fabric is an underutilized consideration in today's healthcare facility. The roller shade presents an opportunity to add a large "acoustically absorbent" device to a room especially with the ever-increasing size of glazing in patient rooms.

While traditionally the only area of acoustical performance considered on a roller shade is the motor (which I consider useless metric in application, we will save that discussion for a later article), the fabric is key.

For example, by changing the openness factor* of a single fabric, again using E-Screen, a robust "work horse" fabric you see that E-Screen 1%, 3%, 5%, and 10% has a wide breath of NRC ranging 0.50, 0.15, 0.10, and 0.05 respectively, or exceptional-to-poor, all depending on the openness factor (Mermet, 2020).

Acoustical benefits of roller shade fabric extend past fabric selection. Engineered control sequences are a woefully under researched area of building science. Veil is currently kicking off an acoustical study with the University of Nebraska where our team aims to test an acoustical interlock where shades are deployed under conditions of continuous noise exposure over a set threshold.

To summarize, a well-designed roller shade system can target one of the hardest surfaces in your space – the curtain wall – and give designers a solution to help improve the acoustical performance of a space and directly affect how a patient perceives noise around them. Veil offers detailed fabric selection, review, and specification writing to help navigate and quantify acoustical performance to help improve patient comfort in a healthcare facility.

**NRC: The Noise Reduction Coefficient (NRC) is a scalar representation of the amount of sound energy absorbed upon striking a particular surface. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption. (Lindeberg, 2018)*

**Openness Factor: How much open space present in a fabric, think views and light through. A 10% openness fabric means that 10% of the surface is open for light to pass through.*

Visual considerations of roller shades

Most architects have heard of – or seen – the dreaded “checker-board” building now, where a clean uniform façade is spoiled by the random, uncontrolled application of white roller shades. While each color on a fabric swatch card has its place, all too often we see roller shade designs where color and fabric selections are neglected, ruining the ability for an architect to control the final installed product. Several of today’s fabrics have dual-sided options allowing designers to select – for example – dark exterior-facing colors to blend with the façade, and light interior colors to match (and add to) the airy feel of the patient room. Do note that while color can affect the thermal performance of the fabric, this is an entirely other discussion (we have mechanical engineers on staff eager to discuss these implications with your MEP engineer).

While tailoring the color of the shade can make it less obtrusive to patients, the openness factor is also critical. The “simple” solution is for an architect to spec a low visibility 1% fabric to guarantee glare is controlled, however this can make for a cave-like feeling in the room. The solution is two-fold:

- Properly tailor each room’s fabric to its use and orientation
- Use engineered control sequences to schedule shade movement and maintain simple and accessible control to patients.

Think of Veil as your expert in curating your patient’s exposure to natural light, our systems excel at maintaining open views that promote sleep-wake cycles through unobtrusive, engineered control sequences. A side note is architects can view fabric as a blank canvas.

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Many of today’s fabrics allow for the printing of detailed text or images on either face of the shade. This can be especially powerful in children’s hospitals where architects can design welcoming, friendly works of art in community rooms and patient rooms alike. Our team recently completed an elementary school design where students’ own artwork was chosen for integration into their building.

Veil works hand in hand with your sustainability consultant and lighting designer to translate

their solar studies into fabric selection and motorized shade control sequences to ensure that patients are in a comfortable environment in your facility. By understanding the impact of the roller shade on the most common daylighting metrics – Spatial

Daylight Autonomy (sDA) and Annual Sunlight Exposure (ASE) our team routinely improves patient comfort via glare control while also presenting opportunity for LEED and WELL pursuance. Visit our sustainability page at veilengineering.com/sustainability to read more.

Interior applications of roller shades

Privacy is another routine complaint from patients. While the long-standing approach has been to provide simple, lightweight medical curtains for in-room privacy, these leave large spaces above and below the curtains. Roller shades have advanced to the point where they can provide novel internal privacy solutions to create a much more durable and isolated perception from the patient. Zipper roller shades (example - Draper ZipShade) are an interior option to give design teams a cleanable, semi-rigid, acoustically beneficial option to create motorized internal partitions.

Sources

Mermet. (2020, November 17). *Enhancing Acoustic Performance through the use of Window Shade Fabric*. Mermet USA. Retrieved January 12, 2022, from <https://mermetusa.com/site/user/files/1/enhancing-acoustic-performance-white-paper.pdf>

Harrison, S. (2022, January 5). *How Do You Design a Better Hospital? Start With the Light*. *Wired*. Retrieved January 9, 2022, from <https://www.wired.com/story/how-do-you-design-a-better-hospital-start-with-the-light/>

Lindeberg, D. (2018, February 5). *What is NRC, STC, and SAA? Design Strategies*. Retrieved January 12, 2022, from <https://www.dsfinishes.com/ds-blog/2018/2/5/what-is-nrc-stc-and-saa>

Weiss, L. (2022, January 7). *Boon for ‘dynamic Glass’ offers window into budget bill lobbying*. *Roll Call*. Retrieved January 10, 2022, from <https://www.rollcall.com/2022/01/10/boon-for-dynamic-glass-offers-window-into-budget-bill-lobbying/>

We could talk shades all day.

let’s work together.



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