

Motorized Pergola Systems

*Optimizing Outdoor Spaces in Hotels,
Restaurants, and High-End Residential Projects*



Welcome to the course, Motorized Pergola Systems: Optimizing Outdoor Spaces in Hotels, Restaurants, and High-End Residential Projects, presented by BNP Media in conjunction with Corradi USA.

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OUTDOOR LIVING SPACE

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Course Description



This course will examine the ways in which motorized pergola systems can help to create memorable, adaptable outdoor spaces. The health benefits of being outdoors, as well as biophilic design in hotels, restaurants, and high-end residential projects, will also be discussed. In addition, the course will help learners determine the ways in which retractable and louvered pergola systems provide solar protection and adaptive lighting for outdoor spaces.

Learning Objectives

1. Examine the importance of connecting to the outdoors, including design considerations for hotels, restaurants, and high-end residential projects.
2. Discover movable, motorized shading solutions that provide solar and rain protection and adaptive lighting for outdoor spaces.
3. Explore design options, features, and accessories for retractable and louvered pergolas.
4. Review case studies where retractable, motorized roof pergolas were specified in project design.



Learning Objective #1

1. Examine the importance of connecting to the outdoors, including design considerations for hotels, restaurants, and high-end residential projects.
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4. Review case studies where retractable, motorized roof pergolas were specified in project design.



To begin, we will examine the importance of connecting to the outdoors, including design considerations for hotels, restaurants, and high-end residential projects.

Nature & the Body's Connection



Research suggests that contact with nature can be beneficial, leading to improvements in mood, cognition, and health. Scientists have determined that “viewing nature is literally a pleasurable experience,” as outdoor scenes trigger receptors in parts of the brain.

Research suggests that contact with nature can be beneficial, leading to improvements in mood, cognition, and health. Scientists have determined that “viewing nature is literally a pleasurable experience,” as outdoor scenes trigger receptors in parts of the brain.¹ Anything in a natural setting, from birds flying to leaves moving in a breeze to a flickering fire or fish swimming, are all able to trigger the receptors. In contrast, looking down a treeless street or staring at a blank wall receive little to no reaction from those same receptors.²

¹Frumkin, Howard et al. “Nature Contact and Human Health: A research Agenda.” *Environmental Health Perspectives*. 31 July 2017. Retrieved from www.ncbi.nlm.nih.gov/pmc/articles/PMC5744722.

²“The Economics of Biophilia: Why Designing with Nature in Mind Makes Financial Sense.” *Terrapin Bright Green*. Retrieved from www.terrabinbrightgreen.com/reports/the-economics-of-biophilia/#the-importance-of-nature-in-retail-spaces.

Nature & the Body's Connection



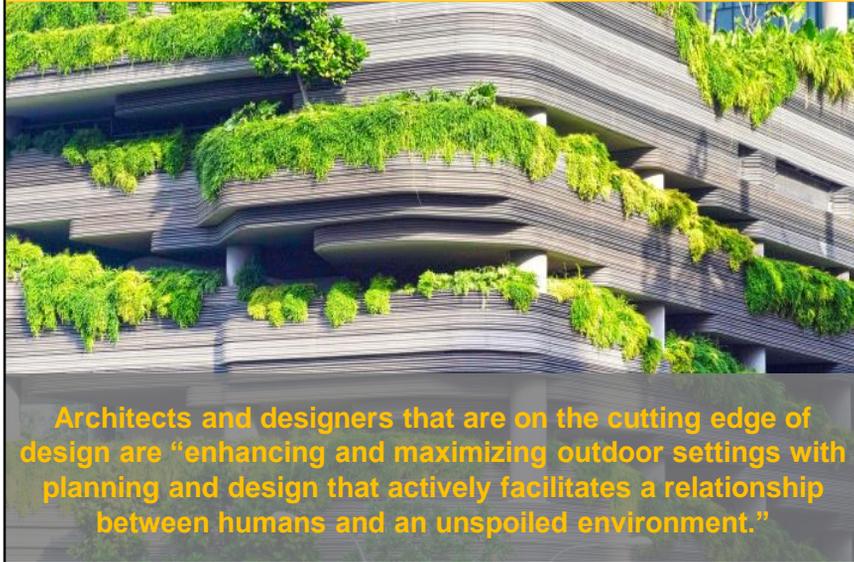
Walking in Nature

- Decreased blood glucose levels by more than **8 percent.**

Even “breathing in” nature has been found to produce substantial health benefits. An ancient practice in Japan, called “Shinrin-yoku” or “forest bathing,” was recently examined by scientists. Researchers found that walks through natural settings decreased blood glucose levels in patients with diabetes. Patients were also monitored while doing other forms of exercise, such as indoor swimming or walking on a treadmill. The results showed that blood glucose levels dropped 8 percent more when walking in nature. It was determined that breathing in the organic compounds found outdoors can lead to significant health benefits.³ Many who live and work in urban settings, however, are often deprived of these natural benefits.

³Ohtsuka, Yoshinori et al. “Shinrin-yoku (forest-air bathing and walking) effectively decreases blood glucose levels in diabetic patients.” *International Journal of Biometerology*. 20 October 1997. Retrieved from www.researchgate.net/publication/51324277_Shinrin-Yoku_forest_air_bathing_and_walking_effectively_decreases_blood_glucose_levels_in_diabetic_patients.

Nature & the Body's Connection



Architects and designers that are on the cutting edge of design are “enhancing and maximizing outdoor settings with planning and design that actively facilitates a relationship between humans and an unspoiled environment.”

Interaction with nature, or at the very least, views of nature, is particularly important today, when many people have limited access to the outdoors and are working longer hours in offices. Contemporary and modern architecture can help to blur the boundaries between indoor/outdoor spaces while also making outdoor spaces more functional, which is particularly important in hospitality settings such as restaurants and hotels. Writing for *Hospitality Design*, Neena Dhillon notes that those on the cutting edge of design in the hospitality sector are “enhancing and maximizing outdoor settings with planning and design that actively facilitates a relationship between humans and an unspoiled environment.”⁴

⁴Dhillon, Neena. “One with Nature.” *Hospitality Design*. 7 February 2018. Retrieved from www.hospitalitydesign.com/projects/hotels-resorts-wellness/one-with-nature.

Biophilic Design: What Is It?

- Theory that humans seek out nature, natural elements, natural forms, and other living organisms
- Characterized by:
 - Exposure to natural lighting
 - Views of nature/room with a view
 - Natural architectural patterns
 - Use of sustainably sourced materials
 - Living green walls/vertical gardens
 - Direct and indirect exposure to nature



Design considerations accounting for the relationship between humans and nature can be termed “biophilic design.” The concept of biophilia was coined by Edward O. Wilson, and he developed the theory that humans have an innately emotional tendency to seek out nature, natural elements, natural forms, and other living organisms. He argues that human affinity for life is “the very essence of humanity” that binds humans “to all other living species.”⁵

The philosophy of biophilia in design is characterized by the following:⁶

- “Exposure to natural lighting,
- “Views of nature/room with a view,
- “Natural architectural patterns,
- “Use of sustainably sourced materials,
- “Living green walls/vertical gardens, and
- “Direct and indirect exposure to nature.”

⁵“Biophilia: Edward O. Wilson.” *Harvard University Press*. Retrieved from www.hup.harvard.edu/catalog.php?isbn=9780674074422.

⁶Sterkenberg, Zack. “Hotel Trends Transforming the Guest Experience in 2018: Part 1.” *Ambius*. 22 September 2017. Retrieved from www.ambius.com/blog/hotel-trends-transforming-the-guest-experience-part-1-macro-trends.

Biophilic Design: Benefits



Design strategies that invoke nature are considered characteristics of biophilic design. And, like nature itself, biophilic design has been shown to have a positive impact on health. Even visual connections to the outdoors have been shown to decrease stress, improve memory, and increase attention. Having a connection to the outdoors further improves worker productivity in office buildings, student performance in classrooms, and purchasing behavior in retail environments.

One organization notes that integrating views with nature can provide the following benefits to a variety of sectors:

- In the office, integration with nature has the potential to save more than "\$2,000 per employee per year in office costs;"
- In hospitals, more than \$93 million could be saved annually in health-care costs if patients have a view to nature;
- In the education sector, schools and classrooms designed with biophilic elements can foster better test scores, improved health, and increased learning rates; and
- For businesses, when surrounded by nature or natural features, owners are able to price goods 25 percent more than those with no access to nature.⁷

⁷"The Economics of Biophilia: Why Designing with Nature in Mind Makes Financial Sense." *Terrapin Bright Green*. Retrieved from www.terrabinbrightgreen.com/reports/the-economics-of-biophilia/#the-importance-of-nature-in-retail-spaces.

Biophilic Design: Hospitality

- Guests spend 36 percent more time in hotel lobbies
- Meaningful guest experiences
 - Guest feedback specific to nature and natural elements
- Increased revenue
- Increased well-being
- Improved brand image



Specific to hospitality, one of the biggest macro trends to have emerged from 2018 was the drive to incorporate biophilic design. Hotels have started using biophilic design to enhance their brands and promote guest well-being and satisfaction. Terrapin Bright Green reports that guests will spend approximately 36 percent more time in hotel lobbies containing biophilic elements.⁷ A side-by-side comparison of reviews from biophilic hotels and traditional hotels yielded results that noted guests in biophilic hotels commented on nature and natural elements the most, while guests from traditional hotels commented most on maintenance and service.⁸ In short, biophilic design can lead to meaningful guest experiences, increased revenue, and well-being, as well as an improved brand image.

Incorporating biophilic elements in hospitality design often includes optimizing space while simultaneously creating a unique experience. For example, open-air spaces can be converted to gardens with a seating area, suites can extend into the outdoors and onto covered patios, and, in some establishments, “neo-rooms” have been created outdoors. Such “rooms” can have modular furniture, transforming outdoor spaces for different functions and allowing guests to personalize their events.

⁷“The Economics of Biophilia: Why Designing with Nature in Mind Makes Financial Sense.” *Terrapin Bright Green*. Retrieved from www.terrapinbrightgreen.com/reports/the-economics-of-biophilia/#the-importance-of-nature-in-retail-spaces

⁸Sterkenberg, Zack. “Hotel Trends Transforming the Guest Experience in 2018: Part 1.” *Ambius*. 22 September 2017. Retrieved from www.ambius.com/blog/hotel-trends-transforming-the-guest-experience-part-1-macro-trends.

Biophilic Design: Hospitality



With the demand for outdoor spaces in hospitality increasing, Landscape artist Christophe Gautrand, comments on the trend:

“Today, spaces are no longer designed as static rooms dedicated to just one activity. To be appealing and useful, they have to be mobile, versatile and adaptable to people’s needs. [When designing a recent project], our goal was to adapt the furniture and all the technical elements to the suite and the bioclimatic pergola on the terrace can be transformed for a temporary spa, a catwalk, a wedding or cocktail reception, or for an unforgettable honeymoon.”⁹

One type of design that is very popular is a louvered shading system that contributed to the versatility of the space. A bioclimatic pergola, which is just one type of outdoor shading system, is equipped with orientable blades that can be rotated by remote control or, in some cases, manually. The rotation of the blades creates an environment that is comfortable in all seasons, and by changing their inclination, sunlight and the degree of natural ventilation in the environment below can be controlled, thereby adjusting the temperature. This creates a custom microclimate to meet customer needs, while with the blades fully closed, the space below is protected from the weather.¹⁰

⁹Provost, Boris. “Indoor-Outdoor Living Inspiring New Hotel & Restaurant Spaces.” *Equip Hotel*. April 2018. Retrieved from www.equiphotel.com/REF/REF_Equiphotel/images/2017-EH/document/cp/gb/cp-in-out-uk.pdf?v=636620729202731787.

¹⁰“Bioclimatics.” *Corradi*. Retrieved from www.corradi.eu/en/products/bioclimatics.

Learning Objective #2

1. Examine the importance of connecting to the outdoors, including design considerations for hotels, restaurants, and high-end residential projects.
2. Discover movable, motorized shading solutions that provide solar and rain protection and adaptive lighting for outdoor spaces.
3. Explore design options, features, and accessories for retractable and louvered pergolas.
4. Review case studies where retractable, motorized roof pergolas were specified in project design.



In the next section of the course, we will discover movable, motorized shading solutions that provide solar and rain protection and adaptive lighting for outdoor spaces.

Motorized Shading Design Solutions



Motorized shading systems help create outdoor spaces that allow users to reap the health benefits of being outside while remaining comfortably out of the elements; the systems also help create outdoor spaces that can be sculpted and controlled to fit specific needs. They can not only be used in hotels, as noted above, but can help maximize the use of restaurant patios or elevate a residential backyard to achieve new levels of comfort and luxury. In any setting, movable, motorized roof protection systems also provide solar protection and adaptive lighting.

Motorized Shading Design Solutions

Retractable pergolas: allow the roof to retract at certain times of the day

Louvered pergolas: allow for the rotation of blades



Retractable pergolas allow the roof to retract at certain times of the day, while louvered pergolas allow for the rotation of blades. Both types of pergolas bring in natural light and offer rain protection by mitigating water which allow these systems to be specified appropriately for spring, summer, and fall, but some are not suitable for winter snow loads.

In a commercial environment, retractable or louvered pergolas can help to extend the outdoor season. Retractable pergolas can be partially drawn or fully extended. One restaurant-focused magazine claimed that outdoor seating can increase revenue by as much as 30 percent.¹¹

¹¹Caldwell, Jeff. "How Outdoor Seating Can Increase Your Revenues by 30%." *Fast Casual*. Retrieved from www.fastcasual.com/blogs/how-to-attract-guests-with-outdoor-seating.

Motorized Shading Design Solutions



Some louvered pergolas are fitted with aluminum blades that can rotate up to 150 degrees, using a wireless control to adjust light, ventilation, and protection from the elements. These pergolas are essentially outdoor aluminum structures equipped with adjustable blades that can be rotated by remote control. As noted above, directing or blocking sun, air, rain, and snow allows for temperature control and protection of the space beneath, creating comfort in any season. Depending on the direction of blade rotation, sunlight can be captured and solar light can be reflected.

A specialized sensor can be added to provide for rain and ice/snow detection and will automatically operate the louvers. It should be noted that snow load calculations for the louver roof model are limited and based on the dimensions of each system order. Additional engineering may be necessary in order to attain a specific snow load, and some snow loads may not be attainable.

Motorized Shading Design Solutions



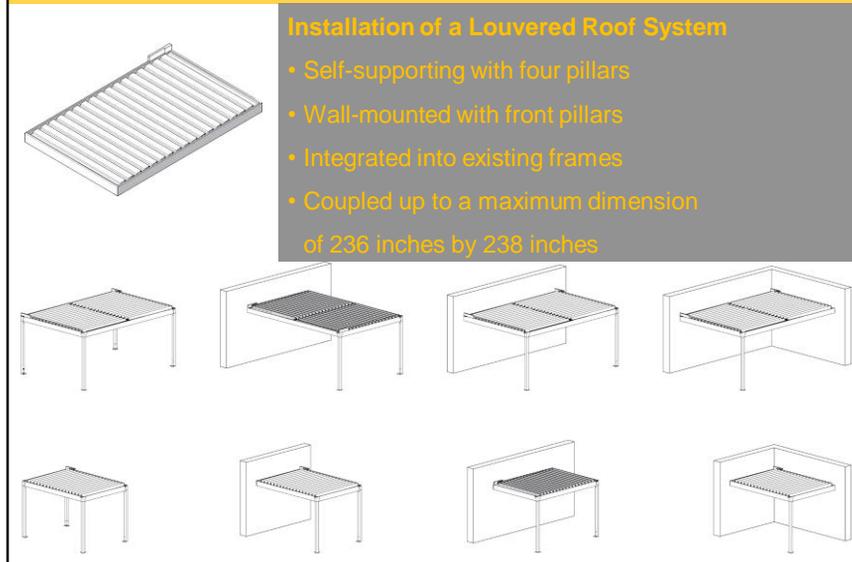
Some pergolas' structures are made up of two different profiles: the front one, parallel to the blades, can contain a gutter system; the longitudinal one, perpendicular to the blades, is always provided with a gutter system and a drip guard that limits water dripping. The louvered roof has a perimeter gutter.

Motorized Shading Design Solutions



When completely closed, the roof is waterproof and a gutter system is integrated into the pillars for drainage. Blades have a slight convex and the unique design of the extrusion allows for water to be channeled to the perimeter gutter even when they are opened. When blades are set to the fully open position, they remain visible on the exterior side. Blades can also be fitted with dimmable LED lighting to maximize the use of outdoor spaces at night.

Motorized Shading Design Solutions



There are several ways to install a louvered roof system:

- Self-supporting with four pillars,
- Wall-mounted with front pillars,
- Integrated into existing frames, or
- Coupled up to a maximum dimension of 236 inches by 238 inches, with no need for intermediate pillars.

Additionally, the front of the louvered roof can be cantilevered in some configurations; the maximum amount of a cantilevered version is 1/5 of the specified projection of the unit.

Overall, regardless of the chosen installation method, the benefits of this system include sun protection, ventilation, and resistance to rain.

Motorized Shading Design Solutions



A retractable roof system incorporated in a pergola is engineered to provide control over the temperature and weather in an outdoor living space. Some manufacturers offer retractable roof systems with an aluminum structure and a folding canvas. The roof incorporates multiple features that manage or mitigate water through the use of specially designed features unique to the roof system.

The canvas is supported by intermediate supporting tubes (dimensions vary) and terminal bars (dimensions vary) set parallel to one another every 24 inches (approximately) on a pitched-roof version and every 20 inches (approximately) on a flat-roof version. It slides on runners that have built-in splash-guards, and the system's six asymmetrical wheels have a load capacity of about 1,000 pounds each. A toothed transmission belt has stainless steel cables and resists a saline environment; the tensile strength is 2,000 pounds at break. The transmission belt is inserted in each runner and is controlled by the drive pulley and a single drive shaft that guarantees the smooth movement of the canvas. The system is operated by a radio-controlled Dunker D839 motor, and the dimensions of its aluminum tubular structure vary.

Motorized Shading Design Solutions



Many manufacturers offer a variety of pergola systems that can be customized to meet an assortment of needs. Multiple variations of aluminum, wood, freestanding, and wall-mount can be customized for a variety of outdoor space. Some models can also be joined together to cover larger areas. Some wall-mounted pergolas are made of aluminum and stainless steel. When open around the perimeter, these structures emphasize the lines of the front nodes, while using the perimeter closures. As well as the ability to specify a seamlessly designed, angled aluminum pergola that has a flush front and modern styling.

Motorized Shading Design Solutions



In addition to the previous styles of pergola, modular pergolas can be specified. These pergolas are suitable for any environment as they are versatile, available in either freestanding or wall mounted, and easily adjoin other pergolas to make covering large spaces easy. The technical features of modular pergolas include eaves and drainpipes fully built into the structure and concealed from view.

Motorized Shading Design Solutions



For larger spaces, such as commercial situations or installations that require strict structural stability, larger wall mounted retractable covering systems are available with a projection of up to 354.3 inches. These are made of aluminum and anchored to a supporting wall. They can be fitted with side closures and a heating system to increase the amount of time spent enjoying the outdoors throughout the year.

Motorized Shading Design Solutions



The most economical retractable pergola system is an aluminum pergola available in a flat version that can be wall-anchored or freestanding. The structure combines stylistic lightness with high structural strength, with minimal impact on the existing architecture and landscape; they are designed to complement and cover any outdoor space. Because these systems are flat, rainwater runs off at the sides. The pillars for the freestanding systems are made of structural steel for improved mechanical strength, and manual or electric controls are hidden inside a beam created with an aluminum profile.

Motorized Shading Design Solutions



In addition to aluminum pergolas, there are traditional wood pergola designs. Traditional wood pergola designs offer an established look of a wooden frame with the modern twist of a retractable roof and are available in a more spacious wall mounted wood pergola. Made of Scandinavian pinewood that is an engineered glulam construction, these pergolas are autoclave treated, and aluminum runners are concealed in the wood rafters.

Versatile modular wood pergolas can be freestanding or wall mounted, pitched or flat, and adjoined with other modular wood pergolas to cover large spaces. They too are comprised of a glulam wood structure and folding canvas.

Motorized Shading Design Solutions



Finally, there are wood pergolas that offer unobstructed views. These mount to the wall without any pillar support (cantilevered). They are a great solution when the only structural support is a wall, without the option of setting front posts. Curved beams offer support to the engineered glulam structure and folding canvas. This type of solution typically has the shortest projection, only reaching up to approximately 13 feet.

Learning Objective #3

1. Examine the importance of connecting to the outdoors, including design considerations for hotels, restaurants, and high-end residential projects.
2. Discover movable, motorized shading solutions that provide solar and rain protection and adaptive lighting for outdoor spaces.
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Next, we will explore design options, features, and accessories for retractable and louvered pergolas.

Design Option: Weather Protection

Waterproof Textiles

- Blackout radiant barrier
- Drop screens



For any pergola system, weather is often at the forefront of design challenges. To address the weather, some manufacturers offer waterproof pergola options with specially designed technical textiles that include a blackout radiant barrier in the center of fabric that blocks light and ultraviolet (UV) rays, allowing for significant control over the temperature in the pergola.

Optional drop screens can also be installed to provide full enclosure protection from natural elements, and retractable gutter designs ensure rain water is effectively channeled away from the outdoor space and back to nature. The screens can also offer protection from insects as well as provide solar protection when deployed.

Design Option: Sustainability



Society is becoming increasingly cognizant of sustainability, and many retractable pergola systems can reduce a building's energy costs while helping property owners reimagine outdoor spaces. Retractable systems block out the sun, keeping homes and businesses cooler in the summer. This allows AC units to operate more efficiently, both aiding the environment and lowering electric bills. According to new studies conducted by the Professional Awning Manufacturers Association across 50 cities in the United States, awnings can help reduce annual cooling energy costs by more than 50 percent.¹²

In addition to energy cost savings, one manufacturer notes that any leftover extruded aluminum from a pergola system installation should be scrapped and recycled. The same company plants more trees than it cuts down, using the resource for its wood pergolas.

Water mitigation strategies should also support sustainable design. Roof systems can be either flat or pitched. If runners are flat, the water drains from the sides of the unit. On a pitched system, the fabric is taut and water drains off the front. Guttering can be added to divert water to a specific area.

Overall, pergola systems allow outdoor spaces to be fully utilized, reimaged, and customized, all while being environmentally responsible.

¹²"New Data Shows that Fabric Awnings and Exterior Shades Can Help Homeowners Reduce Cooling Costs by More than 50%." (2019). *Professional Awning Manufacturers Association*. Retrieved from awnings.ifai.com/why-use-awnings/energy-savings.

Design Option: Material Selection

Aluminum extrusion frames can be powder-coated with an endless array of colors.

For AAMA 2605-05 compliant colors for architecture, visit any coating manufacturer for available colors.

AkzoNobel



Want something other than a stock solid color?
Want the look of wood, durability of aluminum?

Technology exists to coat aluminum with a wood grain, patterns, and special order textures.

Aluminum extrusion frames can be powder-coated with an endless array of colors. For American Architectural Manufacturer's Association (AAMA 2605-05) compliant colors for architecture, visit any coating manufacturer for available color selection.

Design Option: Material Selection



Some pergola systems can be either freestanding or wall mounted. Some can be further manufactured to join together to cover a much larger area. Different products have different maximum dimensions for pitched and flat roofs. The number of runners on a pergola system is dependent upon width and projection.

Design Option: Material Selection

Black-Out Layer



Waterproof Vinyl

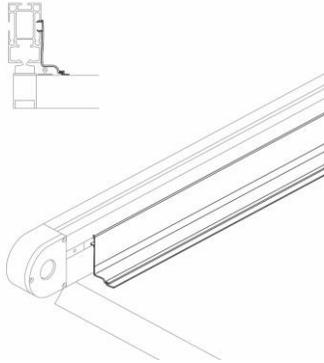


Each pergola system also offers a choice of compatible textile. For example, one manufacturer offers a four-ply black-out textile made from a high tenacity 1100 Dtex polyester base with a PVC laminate. The black-out layer also acts as a radiant barrier, providing superior heat resistance and heat gain as compared to other textiles used in pergola system applications. Embossed finishing on the inner side gives a textile appearance and a dynamic weft effect on the surface. The outer side is anti-dust acrylic lacquered for easy cleaning of the top side.

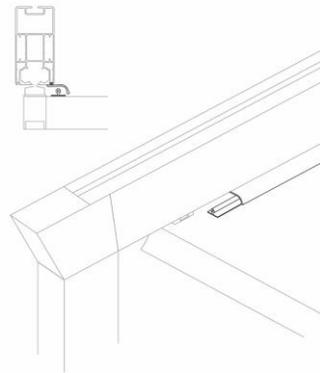
Another textile option is waterproof and transparent and provides excellent luminosity as well as protection from the elements. Waterproof vinyl textile with permanent translucence and a satin finish that provides heat and weather protection along with high UV resistance is an option as well. Yet other choices offer greater thermal protection with optimal visual and lighting comfort. While not all of these are waterproof, they are 100 percent recyclable and UV resistant. Different textiles also come with the choice of different colors.

Design Option: Features

Anti-Drip System



Anti-Spray Profile

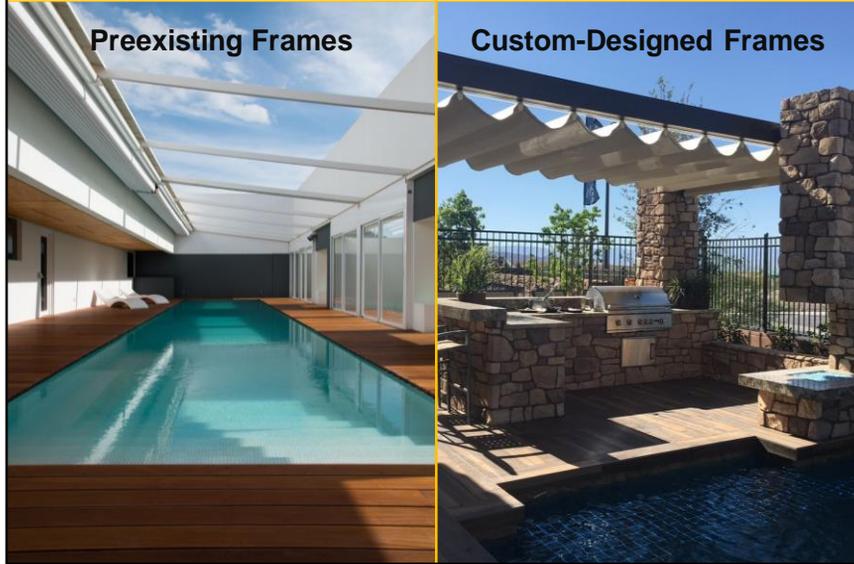


In addition to choices dealing with weather protection, sustainability, materials, and textiles, many pergola systems come equipped with different features that enhance their abilities to protect and control the sun, wind, and rain.

Pergolas with an anti-drip system consist of a weldable PVC profile on the upper part of the canvas offers lateral rainwater retention. This PVC profile is welded to each far side of a pitched roof canopy to prevent water from dripping over the sides and forces the water to shed into the gutter system. On a flat roof version, the PVC profile is welded to the underside of the roof canvas.

Pergolas with an anti-spray profile consist of a PVC profile inserted on the lateral side of the runner ensures the retention of rainwater spray. This feature is offered in addition to the anti-drip system. The anti-spray prevents water from a heavy downpour from “splashing” over the anti-drip profile and dripping over the sides.

Design Option: Integration



Some pergola systems can be installed into pre-existing and custom-designed frames.

Design Option: Integration

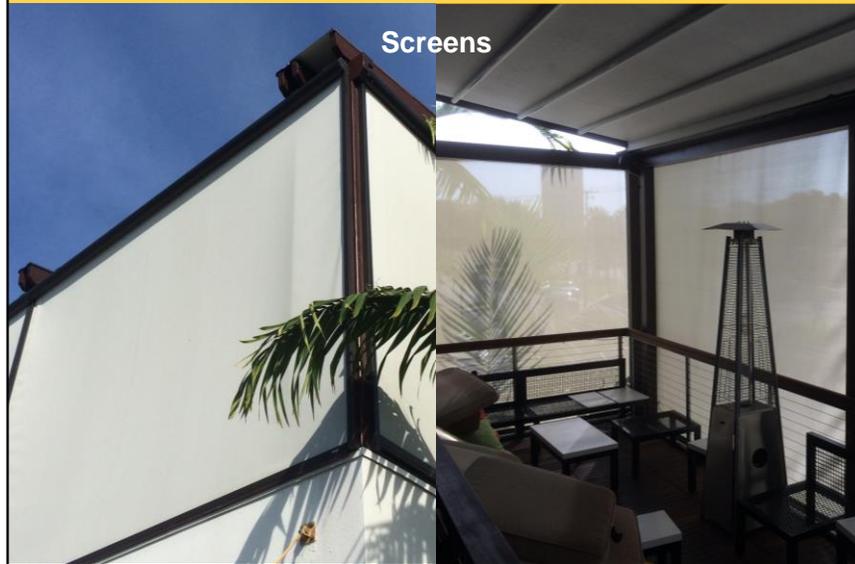


Motorization is the most important of all the features available for a pergola system. It allows for simplified, easy operation by push button, remote control, or wireless wall switch. Home or building integration is also possible for automation, remote control from phone app, or tie-in to a fire-suppression system.

Motorization further allows for complete access wherever a pergola system is installed. For instance, on a high exterior window, motorization allows for easy operation of the screen. Alternatively, if a screen is very tall or exceptionally large, motorization is the best method of effective operation. A motorized shading system particularly comes in handy if there are two or more screens. Sensors on motorized pergola systems further provide for optimum solar protection and can be added to automatically operate the screens when the sun becomes visible. Importantly, when screens are motorized, outdoor spaces are often used more frequently because of ease of operation. It should be noted that retractable awning pergolas and louvered roofs require motors, whereas accessory screens and drop shades have manual options if under 16 feet wide.

A motor beam has an aluminum profile and corresponding accessories that are fixed to a self-supporting motor or to support the protective cover.

Design Option: Accessories



Pergola systems are also specifically designed by some manufacturers with the ability to integrate a variety of accessories.

Exterior screens offer complete enclosure that protects from the elements and gives the option of privacy. Screens can be either manual or motorized. The cost of adding a motorized solution to an exterior screen is not significant in terms of the overall cost of the screen and high-quality solar protection textiles. The motors offered by some manufacturers today have the latest technology that has been developing for more than 30 years in Europe. Today, more and more systems and features are becoming available with solar powered options, helping to meet sustainability goals.

Design Option: Accessories



Lighting

- Adds atmosphere
- Extends hours of usage

Key Features:

- IP65 damp outdoor use
- Remote with four preset intensity levels and dimmer
- 3400 K warm white
- 24V
- Plug-and-play ready
- Easy retrofits

Lighting adds atmosphere and more control over a space by extending the hours of usage in an outdoor space. One manufacturer offers lights that are pre-wired to clear sleeve low voltage cable pigtails with fully sealed waterproof end connections, for easy daisy chaining to additional strips. Dedicated extension cables with waterproof plugs and sockets supply the power to the strips. This design guarantees a quick and secure hook-up both to the strips and single power supply unit, available and furnished in different wattages depending on the number of lighting strips used, up to a maximum of 24 fixtures total per power supply. The strips come with pre-applied 3M adhesive back tape for outdoor use.

Key features include IP 65 damp outdoor use, remote with four preset intensity levels and dimmer, 3400K warm white, 24V, plug-and-play ready, maximum practicality for easy retrofits, kit designed to integrate with every pergola system already installed.

Design Option: Accessories



Curtains can provide a simple answer to shading. They are easy to mount and come in different textiles and colors.

Design Option: Accessories



Depending on system requirements, some allow for a static gutter option while others allow for a retractable gutter option.

Retractable gutters have an extruded aluminum profile for rainwater collection and are only for pitched versions of pergola systems. The gutters move with the roof canopy and have downspouts that merge into a CNC cut in each front supporting post.

Design Option: Accessories



The protective hood cover is an aluminum corrugated standing-seam cover that is positioned where the unit mounts to the wall or at the back of the unit on a freestanding pergola model. It can protect components of the pergola system and prevent any water or debris from collecting in the swags. The hood is powder coated for longevity and also provides for protection of the motor and electronic control box.

Design Option: Accessories



Faux ceilings are an adaptation of the intermediate tubes that make it possible to apply decorative canvas textiles to certain pergola systems. One manufacturer offers a proprietary soft fashion textile that is available in a variety of solid colors to help create ambiance and to match any atmosphere. It is a high-quality, decorative textile designed specifically to withstand the rigors of the outdoors.

Learning Objective #4

1. Examine the importance of connecting to the outdoors, including design considerations for hotels, restaurants, and high-end residential projects.
2. Discover movable, motorized shading solutions that provide solar and rain protection and adaptive lighting for outdoor spaces.
3. Explore design options, features, and accessories for retractable and louvered pergolas.
4. Review case studies where retractable, motorized roof pergolas were specified in project design.



Finally, the course will review case studies where a retractable, motorized roof pergolas were specified in project design.

Case Study: Cane & Canoe Restaurant



First, we will explore how a retractable shade system was specified for a restaurant at the Montage Hotel in Maui, Hawaii.

One of the first noticeable things at the Cane and Canoe restaurant at Kapalua Resort in Maui, besides the ocean view, is the outdoor dining space with a levitating canopy roof—an award-winning installation. This retractable shade system allows diners to enjoy their meals while protected from the sun, wind, and rain. Prior to installation of the roof system, the hotel was unable to seat patrons comfortably in this outdoor space.

The restaurant wanted a retractable canopy so patrons could see the sky. Installing posts in the front was out of the question because they wanted to preserve the view—which meant the canopy needed to be cantilevered. With no support posts above or beneath the structure, the engineering team first decided on heavy steel beams. However, the only way to get to the dining area is through a series of stairs and narrow walkways.

“[The manufacturer’s] systems are strong, beautiful, and utilitarian,” says Gary Barnes, master fabric craftsman at Tropical J’s Inc. in Honolulu. “It is really easy for me to meet our customer needs by working with [them] because they will customize almost anything.”

“The more we looked at it, there was the question of how do you expect to get the materials down there and install it,” Barnes says. “That created a huge engineering problem.” The materials needed to be lightweight but also strong enough to support their own weight and withstand the weather. Choosing a manufacturer who was trusted and adept at customizing products was important.

Case Study: Cane & Canoe Restaurant



The pergola system, made of aluminum and designed to cover large surfaces, was the key to the project's success. "The manufacturer sent me a picture of the [...] product holding up pallets of stone and a photo of him driving his car on it," Barnes says. "That is when I realized the runners are extremely strong, and relative to their strength, they are extremely lightweight."

Barnes and the manufacturer figured out a way to use these runners as the structural perimeter. They created a giant ring from doubled-up runners and hung this between four preexisting concrete posts around the dining space. "We were able to talk the architect into limiting the projection to about 20 feet, which made the whole installation doable with almost no disruption to the resort," Barnes says. "We were in and out in two to three days as opposed to two or three weeks."

There was no room for error in manufacturing. "The tolerance we had to adhere to for this project was plus or minus one millimeter—or about a fifth of an inch," said the manufacturer, adding that the accuracy of the assembly had to be flawless. That is why the manufacturer preassembled the entire structure in their Texas warehouse before shipping the parts to Hawaii. Usually the company doesn't need to test their structures because their products are standardized, but they wanted to ensure this custom design fit together when it arrived. Their precision paid off—the installation went smoothly with no size adjustments needed. The final result became a welcoming space that keeps customers cool and comfortable. When deployed, the system provides an estimated 10-degree drop in temperature.

Case Study: Cane & Canoe Restaurant



Meeting the aesthetic vision of the design was no easy feat. “It is a very high-end restaurant with a lot of fine wood finishes that no one really wanted to cut into or touch,” Barnes says. The project also required a beam two times larger than the manufacturer’s standard beams.

Luckily, the product development team is used to thinking outside the box. “When you look at the [...] beam from the side, it looks like one single tall beam, but it is actually two separate extrusions that have plates engineered to stick them together, which provide the structural forces required to hold the unit up,” says the product development team.

Barnes was concerned about how the steel beams would fit in with the high-end style of the restaurant. The steel beams would have required wood cladding, but this would have added even more weight to the structure. Fortunately, the aluminum shading system didn’t need cladding because of its beautiful finish and high-quality powder coating. The custom beams aligned perfectly with the aesthetic.

Case Study: Cane & Canoe Restaurant



Barnes says installing the system has definitely helped the restaurant's business. "Restaurant owners, particularly in Hawaii, do not realize the importance of outdoor dining to their guests," Barnes says, adding that outdoor dining areas are always the first places to fill up. It is an investment to install an outdoor canopy, but it makes a business stand out from the rest.

"In a world where everybody is trying to separate themselves from their neighbors, this restaurant now has a 100 percent unique product that nobody on the island other than them has," the product development team says. As specialists in commercial applications, the manufacturer often presents return on investment calculations. By adding outdoor seating, restaurant owners gain more functional space, which means more seats to fill and more revenue. "Before, in the industry you really had two options: You either leave the patio open or you close the patio," says the product development team. "We came into the industry with the know-how to make it so you can have either at any point with the push of a button."

Case Study: Cane & Canoe Restaurant



Of course, the manufacturer's products can be used anywhere—from hurricane-prone regions to snowy, mountainous areas. "We have a lot of success in the national market, whether it is New York, Florida, Colorado, Canada, or Illinois," says the product development team.

Many of the company's products are 100 percent enclosed, creating a room that can be heated or cooled. "I have seen heaters, fans, LED lights, TVs, and more installed in our systems," the product development team says.

Having a comfortable space means the world, and it is no secret that low-quality products hurt business. Barnes says many restaurants put up cheap umbrellas, but then they lose business because their umbrellas break from strong winds. This manufacturer's system incorporates aluminum cross members on the fabric to reinforce the entire structure. "For the Cane and Canoe project, each runner had about eight of these, so it's able to withstand massive forces compared to a normal awning or a screen," the product development team says. "The entire purpose of [our] line is to prevent damage from wind, water, and the sun."

In most of their products, the manufacturer uses aluminum they get from extrusions. Any part that is left over does not get thrown away—it is scrapped and recycled. No matter the material, states the product development team, recycling is at the forefront of company culture.

The company also sources their wood from a company that plants more trees than they cut down. "They are net positive when it comes to the sustainability of their forest. And that is important to us too because we do not want to destroy the environment," says the product development team.

Their water mitigation strategies support sustainable design as well. "Through the customization capabilities we have, we can really give the customer all of the options for where they want the water to go based on their design," the product development team says. Any system can be produced in a flat or pitched version, meaning that if the runners are flat, the water drains from the sides of the unit. On a pitched system, the fabric is taut and the water drains off the front. Guttering can be added to divert the water to a specific area.

Case Study: Bahamar SLS Skybar



Next, let's look at the Bahamar SLS Skybar located in Nassau, Bahamas. This project was completed by the Miami Awning Company. When tasked with this project, Miami Awning Company first began by understanding the vision of the project in both an aesthetic and functional capacity. The client's intent for this project was to design a beautiful rooftop bar/lounge and social seating area for their guests with a viable shade and weather solution that would create this outdoor lounge for their guests. They wanted to create a roof-top area that would allow guests to enjoy the area during all types of weather and conditions. The system needed to be quickly deployed to protect the area and the guests from rain, provide flexibility for shade and weather protection when needed, or to be open to the clear blue sky during the day or spectacular night sky for dining under the stars at night. The custom installed retractable canopy system was the perfect solution for the client's requests. This system allowed the client flexibility to view clear skies during spectacular weather or the protection from inclement weather.

Case Study: Bahamar SLS Skybar



As with any project, several challenges were faced by the project team. Most of the complexity with the project was in the consideration of being able to place the project in the location on the 20th floor. Considering that the project is 62 feet 6 inches long by 33 feet 6 inches wide, the aluminum structure of the project was designed and fabricated to be assembled modularly in 12 steps. Another factor of complexity is that there were not and are not any cranes high enough to allow the project to be lifted and dropped into place. This necessitated for the project to be fabricated in segments that are posts and trussed members. Each segment was clearly marked and lifted with crew on the ground and on the roof of 20th floor. The assembly was organized to start on one end with two corner posts, the end trusses and intermediate posts, working toward the other end, adding posts and intermediate trusses, until the entire supporting structure was in place. Special 32-foot-long tubes were used to package and ship the four motorized retractable portions of the canopy. These contained the fabric on the rails that were to be installed on the frame. These also had to be properly lifted and installed to the custom supporting framework.

The canopy system is composed of four individual units. The canopy sits 10 feet 6 inches off the base level of the 20th floor of the SLS Bahamar Hotel. The custom frame structure is attached to concrete bases on the 20th floor of the hotel that had to be coordinated with the contractor. The structure is a custom heavy-duty powder-coated aluminum sub-structure that supports four fully motorized retractable fabric systems.

Case Study: Bahamar SLS Skybar



The final result was the installation of the SLS Bahamar Skybar Motorized Canopy. The restaurant has embraced the versatility of the product and are using it on a daily basis. The Skybar's ownership is pleased with how the Canopy created a spectacular outdoor bar/lounge area for their guests. The motorized retractable canopy system created the "idyllic rooftop oasis" for clients to take in the sun, moon, or stars and enjoy cocktails. It created a special place for guests to come day or night for one of the finest views in the Bahamas, no matter the weather.

Conclusion



Today's designers continue to maximize and enhance the use of outdoor spaces, embracing Wilson's concept of biophilia. Well-being is at the forefront of the latest design trends, particularly in the hospitality industry, as customer satisfaction surveys indicate that unique outdoor spaces lead to the creation of memorable guest experiences, increased well-being and revenue, and an improved brand image.

Motorized pergola systems can further add to the versatility of an outdoor space. Retractable pergolas allow for the roof to retract, and louvered pergolas permit the rotation of blades; both systems allow for greater control of daylight and have the potential to protect from rain and snow. Motorized pergola systems also contribute to sustainability efforts, as they can cut down on a building's energy costs. One manufacturer also scraps and recycles leftover extruded aluminum from installations. Motorized pergola systems can also come equipped with additional features, such as anti-drip systems, to offer further protection.

Overall, motorized pergola systems can contribute to well-being, sustainability, and the function of a space. Importantly, they can help to transform any outdoor area into a space worthy of spending time in, making outdoor living beautiful.

Thank You

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