

## LANDSCAPE LIGHTING

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*Additional index words.* low voltage lighting, lighting techniques.

**Abstract.** Landscape lighting is essential for safe and secure movement of people onto or within the landscape and can extend the functional period of outdoor living areas. Outdoor lighting can also extend the perspective of an indoor room to the outdoors by illuminating attractive features such as specimen plants, sculptures, water features, or structural features. A basic rule in residential landscape lighting is to use indirect lighting and avoid direct "head-on" lighting of plants and objects. Indirect lighting is achieved when the light source is hidden from view and only the effects of light are seen as it is reflected from one or more objects or surfaces. Basic techniques in landscape lighting include down-lighting, up-lighting, silhouette-lighting, shadow-lighting, cross-lighting and graze-lighting. Low voltage lighting systems are recommended and their basic components are discussed.

Properly designed landscape lighting can extend the enjoyment of landscape features into evening hours and provide for the safe and secure movement of people within the residential or commercial landscape during evening hours (4). Illumination of steps, ramps, walks and passageways between buildings is essential. Well-lighted entrances and driveways also allow easy identification of visitors and can discourage trespassers.

With the fast-paced life of the 1980's, landscapes are most often enjoyed during the evening hours. Landscape lighting can provide safe access to the various activity areas of the landscape as well as accentuate such landscape elements as specimen plants, sculptures, water features or structural features. Cooking, dining, recreational games, entertaining and socializing are among the outdoor activities that may require lighting. Lighted landscape features viewed from an indoor room can make the room appear larger and have significant impact on the mood of the room. In other words, landscape lighting can allow people to be indoors without leaving the garden behind.

### Lighting Principles

The comfort and safety of people are the first considerations when designing a landscape lighting plan. Glare from light at eye level should be avoided and the height considered eye level differs with the function of a landscape area. For example, eye level in an area where people will be standing or walking is about 5 feet but eye level in a sitting area may be considered about 3.5 feet. Light bulbs should not be in direct view at eye level, especially close to traffic or sitting areas.

The effects of light should be obvious but the light source should not be seen. This type of lighting is called

Florida Agricultural Experiment Stations Journal Series No. 8499.

indirect lighting and should be the primary lighting technique used in residential landscapes. Direct or "head-on" lighting of an object from a fixture between the viewer and the object makes the object appear two-dimensional or flat and does not enhance attractive textural quality or form. Indirect light, reflecting off surfaces and objects, helps define its qualities and increase our interest in it.

Lighting techniques used in landscapes include down-lighting, up-lighting, shadow-lighting, silhouette-lighting, graze-lighting and cross-lighting. Several of these techniques can and should be employed in an effective and interesting lighting design.

*Down-lighting* is the most common technique, with a light source shining down to illuminate objects directly below it. This is the most effective means of lighting a large area. Placement of a light fixture high above a children's play area can provide uniform light for their activities. Light passing down through tree canopies can create interesting shadow patterns on patios and other surfaces. Down-lighting can also be utilized close to the ground to illuminate walks or steps. Care should be taken to avoid casting shadows on steps and walks.

*Up-lighting* is accomplished by directing light up onto an object and usually away from the primary direction of view. This technique is useful for accentuating a specimen plant or object of interest.

*Shadow-lighting and silhouette-lighting* is accomplished by illuminating an object from one side and can be used to dramatize its form. Shadow-lighting is achieved by positioning the light so a shadow of the plant or object is cast on a patio surface, fence or wall. Silhouette-lighting provides a lighted background on which to view a dark object or it can be used to light an object that can be viewed against a dark background. In either case, this lighting technique uses the contrast between lighted and dark objects or spaces to accentuate an object's form.

*Graze-lighting* is especially effective for emphasizing the textural quality of a surface or object. By placing the light source at a low angle with respect to the surface to be illuminated, shadows created by the texture of the object magnify its textural features. Masonry siding, fences and plant foliage or bark are among the objects that may be effectively illuminated by graze-lighting. Plants with a dense growth habit are good candidates for graze-lighting.

*Cross-lighting* illuminates an object from opposing directions, either side-to-side or back-to-front. This is especially useful in large areas where an object will be viewed from different angles.

The reflective quality and color of objects to be illuminated determine the proper light intensity. The same light placement but different intensities can create an atmosphere of mystery, or safety and security. Bulbs with wattages of 20 to 150 are used in landscape lighting, with 30- to 60-watt bulbs being most common. The lower wattage bulbs are most effective in small areas, while the high wattage bulbs are necessary to illuminate the branches of a large oak or provide down-lighting in a children's play area. Variable dimming switches allow changes in mood or atmosphere of an area for different functions. Transition in light intensity for a person moving from one activity

area to another, including from inside to outside, should be provided.

Colored lights can be used effectively in the landscape, but they should not be overused. Many colors used simultaneously in a small area can create a busy, confusing atmosphere and should be avoided. Clear light brings out the intensity of all colors.

### The Planning Process

Landscape lighting is often an after-thought, but should be planned before the first plant is transplanted into the landscape (1, 2). Examine the overall landscape plan and identify the access routes to the house as well as play and service areas. Determine the focal points in the landscape and assess the potential benefits of illuminating features at these focal points. Locate electrical service junction boxes and landscape elements such as pools that would interfere with placement of electrical wires and light fixtures.

If no other lighting is provided, the path from the driveway and/or street should be lighted. Flood lights positioned on the corners of a house generally do not adequately light the access or entrance area. These lights are usually designed to provide light on objects to be viewed from inside the house and can limit the vision of someone approaching the house. Work and play areas should be next on the priority list to be lighted. Down-lighting is most effective in such areas. Light fixtures positioned at least 14 feet above the children's area in a tree or on a pole have proven effective.

Once the locations of lighting fixtures have been determined, an electrical system must be planned to connect them to the electrical source. It is recommended that a certified electrician be consulted on this process. The position of lighting fixtures relative to each other and the electrical source is the first consideration in determining the number of circuits needed. A large number of circuits will add more flexibility in the use of the system, but also adds to the installation costs.

Reprinted from

*Proc. Fla. State Hort. Soc.* 100:149-152. 1987.

## BAMBOO—AN EMERGING PLANT FOR INTERIORS

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*Additional index words.* foliage plant, light intensity, container design, *Arundinaria*, *Bambusa*, *Chimonobambusa*, *Oatea*, *Phyllostachys*, *Pseudosasa* and *Sasa*.

**Abstract.** Considerable interest in usage of selected bamboo species and cultivars as indoor ornamentals has developed recently. Eleven bamboos are presently listed by Florida wholesale nurseries for commercial interiorscapes. Of 16 bam-

### Installation and Estimated Costs

Low voltage lighting systems are recommended to maximize the safety of the system during its operation. Installation of a low voltage system is also not as dangerous as the installation of a high voltage system. Although low-voltage lighting systems can be purchased, they usually do not provide the flexibility necessary to provide a complete, interesting and effective landscape lighting plan.

The central core of a low voltage lighting system is the transformer that reduces standard 110-volt house current to 12 volts. The size of transformer needed depends upon the total wattage of the fixtures in a system. Timers or other types of controllers are connected to the transformer and the individual circuits are wired to the controller. Water-proof wire and switches, sockets and fixtures rated for outdoor use should be used. A more detailed examination of a residential lighting system is presented in Florida Cooperative Extension Service Circular 588, available from county extension offices (3).

Installation costs will differ with the size of the system and the accessibility of electrical current suitable for outdoor service. However, the equipment and materials costs necessary for a low voltage, residential lighting system comprised of 19 fixtures, a transformer and time-clock controller has been estimated at \$500. Operating costs obviously depend on the frequency and duration of use. Assuming flexibility to operate several lighting circuits independently, the average annual cost of a system described above would \$80 to \$100.

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**boo species evaluated at CFREC-Apopka, *Bambusa oldhami*, *B. vulgaris* 'Vittata', *B. glaucescens* and *Sasa palmata* seem to have the most interiorscape potential. *Pseudosasa japonica* was taller when grown under 47 percent shade compared to plants under full sun, but plant grade and number of culms were the same. Development of rhizomes through container drainage holes were the same whether grown in conventional round pots or pyramid root pruning containers.**

Bamboos are members of the grass family, *Gramineae*, and are indigenous to every continent except Europe and Antarctica (6); approximately 1000 species of bamboo are reported to exist worldwide (7). Bamboo has a long history of utility in many areas of the world where it is used for many types of construction, tools, food, fuel, paper and

Florida Agricultural Experiment Station Journal Series No. 8694.

*Proc. Fla. State Hort. Soc.* 100: 1987.