Cable Railing Assemblies:
Prefabricated Kits and Custom Design Options

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Overview: Cable Railing Assemblies
Overview: Cable Railing Assemblies

Introduction

When it comes to railing infill, most people immediately think of vertical pickets, horizontal rails, or glass panels. However, today's cable railing infill options offer many benefits:

- Very strong
- Extremely durable
- Versatile
- Attractive
- Low maintenance
- Easy to use
- Virtually invisible

Perfect for projects with a view
Advantages of Cable Railing Assemblies

- Cable has strong tensile strength with minimal stretch; excellent for strong, durable infill barriers.

- Wide variety of cable fittings are available to meet virtually any attachment condition and design need.

- Cable assemblies can be installed on wood or metal frames.

- Cables are slender and unobtrusive and will not impair views through the railing.

- Stainless steel ensures durability, low maintenance, and lasting beauty.
Overview: Cable Railing Assemblies

Versatility of Cable Railing Assemblies

Cable railing assemblies can be used on wood or metal railings, fences, or trellises in exterior, interior, residential, or commercial settings. Please note, however, that the cables, fittings, and assemblies discussed in this presentation should never be used for lifting, hanging, or other high-load conditions; the manufacturer can recommend other cables and components for these types of critical applications.
Overview: Cable Railing Assemblies

Advantages of Prefabricated Cable Railing Assembly Kits

Feeney offers cable assemblies in standardized kits or packages with pre-cut lengths and predetermined end fittings. The benefits include:

- Save time and money.
- Standardized lengths simplify ordering.
- Excess cable is trimmed in the field so exact railing measurements are not necessary when ordering.
- Special cable fittings make installations quick and easy.
- No special crimp tools are required.

Prefabrickated assemblies will be discussed in more detail later in the presentation.
Overview: Cable Railing Assemblies

Advantages of Custom Cable Railing Assemblies

While prefabricated cable assembly kits can take care of most applications, some railing and architectural designs may require special sizes and types of cables and fittings to meet specific design and function needs. The benefits are as follows:

- Wide array of sizes and styles of cables and fittings are available.
- Assemblies can be built to meet very specific design and function needs.
- A variety of fitting attachment methods allow assemblies to be fabricated on the jobsite or at the factory.

Custom cable assemblies will be discussed in greater detail later in the presentation.
Cable Assembly Care and Maintenance

Cable railing assemblies are typically made from type 316 stainless steel for weather-tough durability and very low maintenance. The protective chromium oxide on the surface of stainless steel gives it superior corrosion resistance.

Properly maintained, stainless steel provides excellent luster, strength, and durability. In most applications, stainless steel will not rust or stain even after many years of service; however, it is not rust or stain proof. With proper care and maintenance, as specified by a manufacturer, cable railing assemblies can remain beautiful and functional even when exposed to harsh marine environments.
Cable Assembly Care and Maintenance, cont’d...

CableRail assembly care and maintenance recommendations and practices include:

- Only clean stainless steel with soap and water or a stainless steel cleaner. Never clean with mineral acids or bleaches.
- Always remove stains or rust spots as soon as possible with either soap and water or a stainless steel cleaner.
- Never leave stainless in contact with iron, steel, or other metals. This can cause rust spots or corrosion.
- Never use coarse abrasives like sandpaper or steel wool on stainless. Use synthetic general purpose scouring pads instead.
- Important: Periodically inspect cable assemblies for proper tension and re-tension as necessary.
Frame Design
Introduction

As mentioned, cables can be used on wood or metal railing frames, but the frames need to be structurally sound. That is, they need to be designed and built strong enough to not only meet code requirements but also support the tension of properly installed cables, which could exceed 300 lbs per cable. In addition, frames should be designed to use cable infill efficiently, thereby saving materials, time, and money.

This section will outline some basic guidelines on how to properly prepare railing frames for cable infill. These guidelines will apply, whether using 1/8", 3/16", or 1/4" diameter cable assemblies.
End and Corner Posts Requirements

The end and corner posts need to be strong enough to support the full tension of the cables, which could exceed 300 lbs per cable. Below are recommended minimum sizes for the end and corner posts only. The intermediate posts do not support any tension load and only need to be sized as necessary to support the cap rails and meet railing frame code requirements.

- **Square tube**: 2" wide x ¼" wall
- **Flat Bar**: 2" wide x 1" thick
- **Angle Iron**: 2" wide x ½" thick
- **Extra Strong Pipe**: 1½" ID, 1-7/8" OD
- **4x6 Wood**: 3½" wide, 5½" thick
Basic Frame Design Requirements

**Spacing From Walls**: Set end posts three to four inches away from any wall face to allow access for attaching cable end fittings.

**End Posts**: Use minimum end post sizes as noted on the previous slide and securely bolt or lag to joists or deck surface.

**Intermediate Posts**: Sized as required for cap rail support strength or for code.

**Double Corner Posts**: If possible, use double corner posts to allow the cable to run continuously through the corners without terminating. This will save money by reducing the overall number of cable assemblies needed.

**Post Spacing**: Space all posts and vertical spacers (discussed next page) a maximum of three feet apart to minimize any deflection that may occur if the cables are ever forced apart.
Basic Frame Design Requirements, cont’d...

**Cap Rail:** Always include a strong, rigid cap rail that is securely fastened to all posts. The size should be based on load strength needs and local code requirements.

**Railing Height:** Minimum height should be 42” or as set per local code.

**Cable Spacing:** *Maximum three inches* apart to allow for cable deflection if ever forced apart.

**Wood Blocking:** Underneath the cap rail attach minimum 1”x 4” size wood blocking between posts to provide additional lateral reinforcement. (Wood frames only)
Frame Design Options

**Vertical Spacers:** Slender spacers may be used instead of some of the larger intermediate posts to achieve a more open railing design. These are non-structural members and are only intended to maintain cable spacing and minimize deflection. Use materials such as 2" x 2" wood strips, 1" metal tubing, or ¼" flat bar and attach to the cap rail and either the foot rail, deck surface, or joists.

**Foot Rails:** Foot rails are another design option, and they should be spaced no more than four inches above the deck surface, or as required by local code, and should be sized as needed for support strength and design appearance.

**Single Corner Post:** Single posts can be used instead of a double corner post configuration. In most cases, however, cables must be terminated at single corner posts. Exceptions are angle iron posts or tubular metal posts. Corner post details are discussed in the next section.
Maximum Cable Run Lengths

When a cable passes through posts and around bends, friction is imparted on the line. Running a cable continuously through too many posts or bends will eventually restrict the ability of the cable fittings to properly tension the line. Therefore, it’s necessary to either restrict the length of individual runs or incorporate In-Line Turnbuckles (*discussed later*) to provide the extra adjustment needed to overcome the additional resistance. Two basic guidelines for ensuring proper cable tensioning are as follows:

- Straight runs should terminate or have an In-Line Turnbuckle every 50 feet or less.
- Runs with bends should terminate or have an In-Line Turnbuckle after every 2nd bend or 40 feet, whichever distance is less.
Code Requirements

Building codes vary by state, county, and city, so it’s important to note that following a manufacturer’s recommended railing design and installation procedures does not necessarily ensure code compliance in all areas. Therefore, before starting a project, always consult with your building department to see if there are any special local requirements for using and installing cable railings.
Code Requirements, cont’d…

Two of the most important code issues relating to cable infill are the 4-inch sphere rule and the restrictions on horizontal infill.

4-Inch Sphere Rule:
In most areas, building codes require that guardrails have intermediate rails, balusters, or ornamental infill patterns that will not allow passage of a sphere four inches or more in diameter. Since cables are semi-flexible, it is necessary to allow for the possibility of cable deflection when designing a railing. This is done by spacing the cables and posts (or vertical members) such that the cables will not open past the four inches of the sphere when a reasonable force is applied. From experience, manufacturers have been able to determine that when the cables are spaced no more than three inches apart and the posts or vertical members are spaced no more than three feet apart, one can easily tighten the cable such that they will comply with the four-inch code rule. These spacing recommendations will apply regardless of the cable diameter being used.
Horizontal Infill:
There has been a lot of discussion over the years regarding the safety of horizontal elements in railing designs because of a perceived climbability issue. In fact, the very first edition of the International Residential Code (IRC) actually included a restriction on horizontal railings. However, after extensive independent research was conducted and reviewed by an International Code Council (ICC) code committee, the restriction was removed in the very first IRC supplement (details of this research are available upon request). The International Building Code (commercial codes) never included wording that restricted horizontal railing elements.

Some building departments, however, are not yet using the International Code Council (ICC) codes and continue to prohibit horizontal infill. This is becoming less of an issue as more and more building departments adopt the ICC wording which allows horizontal infill designs. But, it’s always a good idea for architects and installers to check with their local building officials before starting a project to confirm that there are no restrictions on horizontal infill in their area.
Frame Design & Cable Installation Checklist

- Review manufacturer's instructions & recommendations.
- Consult local building department.
- Plan optimal position for all end and corner posts.
- Space posts and verticals a maximum of 3 feet apart.
- Secure posts to cap rail and deck structure.
- Use proper post sizing for all end and corner posts.
- Space cables a maximum of 3 inches apart.
- Do not exceed maximum run lengths.
Prefabriated Cable Assembly Kits
Introduction

CableRail by Feeney prefabricated cable assembly kits are standardized and contain all of the components, fittings, and hardware necessary for assembly and installation. Kits are available in a variety of cable diameters and lengths.

This section will provide information regarding the cable size options, fittings, accessories, and installation details for these types of kits.
Cables

The cable used in prefabricated cable assembly kits is 1x19 construction (one strand of 19 wires) type 316 stainless steel strand for strength, durability, and weather protection. It’s smooth to the touch, visually attractive, and highly resistant to abrasion. Assemblies are usually available in cable sizes 1/8", 3/16", and 1/4" diameter and are designed to replace commonly used metal or wood railing pickets.

1/8” Ø assemblies: Most popular and economical option for residential and light commercial.

3/16” Ø assemblies: Extra durable option for all commercial and residential applications.

1/4” Ø assemblies: For high wear, high traffic areas. Typically used on metal railings only.
The Fittings

Each cable assembly comes with a **threaded terminal** fitting on one end and a field installed **automatic-locking Quick-Connect®** fitting for the other end.

The threaded terminal end comes already factory attached (swāged) to one end the cable. It’s then fastened to an end post using a flat washer and a nut, and the line is tensioned by spinning and torquing the nut. The threaded terminal is available in two sizes: 4-¼ inches long for metal posts, and 7-½ inches long for wood posts.
The Fittings

The **automatic-locking Quick-Connect® fitting** attaches to the cable by hand in the field without special tools. One-way jaws allow the cable to easily slide through in one direction but automatically grab and lock-on when the cable is released. The cable is slipped through the fitting and pulled taut; any excess is then trimmed off.

Both fittings are then capped and finished with colored or stainless steel end caps.
Accessory Hardware

**Stainless Protector Sleeves** protect the wood corner and stairway transition post holes from cable abrasion.

**Grommets**, an optional item, add a finished detail to holes in tubular metal posts.

**Stainless Beveled Washers** provide a flat bearing surface for end fittings on angled holes at stair end posts.

**End Caps** (stainless or colored) are a decorative option for covering and finishing the threaded terminal and automatic locking connector fittings.
Installation

1) Mark hole locations

2) Drill cable holes

3) Secure threaded terminal fitting at one end post with washer & nut.

4) Lace cables through the intermediate posts and opposite end post and attach a Quick-Connect® fitting.
Installation, cont'd...

5) Eliminate the slack in the line by pulling the excess cable through the Quick-Connect®.

6) Adjust final cable tension by spinning the threaded terminal nut.

Prefabrcinated Cable Assembly Kits

Follow the recommended tensioning sequence shown below. The tensioning sequence starts with the middle cable and works its way to the outer cables in an alternating pattern. This method helps to minimize stress on the railing frame and makes it easier to adjust uniform tension across all of the cables.
Installation, cont'd...

7) Trim excess threads

8) Trim excess cable

9) Finish with decorative end caps
Wood Railing Details - Corner Posts

Depending on the configuration of the corner posts, cables can either be terminated at the corners or strung continuously through the corners.

A double wood corner post offers the option of either terminating or running the cables continuously. One benefit of continuous runs is that fewer cable assemblies and fittings are needed, thereby saving material costs and installation time.

When using a single wood corner post, the cables must be terminated at the corner, and the drill holes must be offset horizontally by at least ½-inch to prevent the fittings from hitting one another inside the post.
Wood Railing Details - Protector Sleeves

Stainless steel protector sleeves are designed to protect the wooden posts from cable abrasion. They’re inserted into the drill holes at all locations where the cable would have a tendency to cut into the wood, such as stair transition posts and the outside faces of double corner posts.

At stair transition posts

At double corner costs
Wood Railing Details - Beveled Washers

If cables are terminated at stair end posts with angled drill holes, then beveled washers must be used to provide a flat bearing surface for the end fittings. Without them, the fittings would neither set nor align properly when attached to the posts.

Stair post termination at threaded terminal end.

Stair post termination at automatic locking Quick-Connect® fitting end.
Metal Railing Details - Continuous Runs

Metal frames can also be configured with corner posts that allow the cable to either be terminated at the corners or run continuously. Below are examples of post configurations for continuous runs.

Square or rectangular tubing would be the same as that shown for round pipe.
Metal Railing Details - Terminating Runs

These graphics show various configurations of metal corner posts with the cables terminating.

Notice that when cables are terminated on single pipe corner posts (or square or rectangular tube posts), the drill holes must be offset horizontally by at least ½-inch to prevent the fittings from hitting one another inside the post.
Metal Railing Details - Beveled Washers

As with wood posts, metal posts also require the use of beveled washers at angled stair terminations.

Stair post termination at threaded terminal end.

Stair post termination at automatic locking Quick-Connect® fitting end.
Interior Applications - Prefabricated Cable Assemblies
Prefabricated Cable Assembly Kits

Exterior Applications - Prefabricated Cable Assemblies
Custom Cable Assemblies
Introduction

While the prefabricated cable railing assembly kits can take care of most applications, some railing and architectural designs may require special sizes and types of cables and fittings to meet specific design and function needs.

For those distinctive railing design projects, some manufacturers offer a wide assortment of cables and fittings for fabricating custom assemblies. Components can either be ordered individually for fabricating assemblies at the jobsite or as complete made-to-measure assemblies directly from the factory, ready to install.
Cable Options

The most common choices for railings and architectural applications are uncoated 1/8", 3/16", and 1/4" diameter 1 by 19 and 7 by 7 construction cables made from 316-grade stainless steel. They offer excellent strength, abrasion-resistance, weather-protection, low maintenance, and lasting beauty.

1 x 19 construction cables are made up of 19 individual wires that are twisted into a single semi-flexible strand. Excellent for all railings with straight runs and normal bends.

7 x 7 construction cables have 49 individual wires that are woven into a single, flexible strand. Best for railings or other applications where more aggressive bending is required or where a woven wire appearance is desired.
Cable Options, cont’d…

Clear and colored vinyl and nylon coated cables are also occasionally used, but the coatings can easily scratch and are not recommended for exterior applications as they tend to deteriorate over time when exposed to sunlight and the elements.

Galvanized and bright steel wire cables are also available, but they are rarely used because they are visually less attractive and also tend to be more vulnerable to exterior conditions.

It’s always a good idea to consult with the manufacturer before specifying cable to ensure that you are selecting the correct product for your application.
Custom Cable Fittings

There are two types of cable fittings: Fixed Ends and Tension Adjustment Fittings.

**Fixed Ends** are non-adjustable end termination fittings, sometimes referred to as "dead ends", that have no tensioning capabilities. Therefore, each fixed end must be paired with a tension adjustment fitting.

**Tension Adjustment Fittings** include threaded terminals, turnbuckles, and adjusters that are used to tighten the cable lines. Tension is adjusted by tightening the nut on the threaded terminals, spinning the tubular body on the turnbuckles, or rotating the bolt on the adjusters. Tension Adjustment Fittings can be paired with either a Fixed End or another Tension Adjustment Fitting.

Every cable assembly must have at least one tension adjustment fitting in order to tension the line.
Fixed End Fittings

Fixed Jaw End
Uses a removable clevis pin to attach to eyebolts, eyelets, or drilled welded tabs on the face of a post or wall. Flexible 180° pivoting make these ideal for stairs and angled connections. Usually paired with a Jaw Turnbuckle (shown later). When measuring for assemblies, the center of the clevis pin is the measure point.

Fixed Surface Mount
Attaches directly to the face of end posts or frames using lag screws or bolts. Offers 130° pivoting for easy angled connections. Typically paired with a Surface Mount Turnbuckle (shown later). When measuring for assemblies, the face of the termination post is the measure point.
**Fixed End Fittings, cont'd...**

**Fixed Cap End**
Inserts through a drill hole in the end post and is secured with a small screw-on end cap. Beveled washer is needed on angled stair terminations. Most commonly paired with a Cap End Turnbuckle (*shown later*). When measuring for assemblies, the outside bearing face of the termination post is the measure point.

**Fixed Ball End**
Inserts through a drill hole or slot in the end post and is secured with a screw-on ball. The ball pivots to allow angled connections without beveled washers. Usually paired with a Ball End Turnbuckle (*shown later*). When measuring for assemblies, the outside bearing face of the termination post is the measure point.
Fixed End Fittings, cont'd...

Fixed Lock Toggle
Used on tubular metal posts where the railing design only allows for penetration of one side of the post. The fitting passes through a drill hole and toggles into a locked position inside the post leaving no exposed hardware.

These fittings will accommodate angled conditions without beveled washers and are typically paired with another Fixed Lock Toggle plus an In-Line Turnbuckle (*shown later*). When measuring for assemblies, either the inside bearing face or the outside face of the termination post can be used as the measure point.
Custom Cable Assemblies

Tension Adjustment Fittings

Every cable assembly must include at least one Tension Adjustment Fitting to provide tension to the cable line.

These fittings include threaded terminals, turnbuckles, and adjusters, and the tension is adjusted by tightening the nut on the threaded terminals, spinning the tubular body on the turnbuckles, or rotating the bolt on the adjusters.

The methods for attaching these fittings to the termination posts are similar to those used for the corresponding Fixed Ends.
Tension Adjustment Fittings, cont'd...

**Jaw Turnbuckle**
Uses a removable clevis pin to attach to eyebolts, eyelets, or drilled welded tabs on the face of a post or wall. The 180° pivoting makes these ideal for angled stair connections. Usually paired with either a Fixed Jaw End or another Jaw Turnbuckle. When measuring for assemblies, the center of the clevis pin is the measure point.

**Surface Mount Turnbuckle**
Attaches directly to the face of a post or frame using lag screws or bolts. The 130° pivoting easily allows for angled stair connections. Most commonly paired with either a Fixed Surface Mount or another Surface Mount Turnbuckle. When measuring for assemblies, the face of the termination post is the measure point.
Tension Adjustment Fittings, cont'd...

Cap End Turnbuckle
Secured to an end post using a small screw-on end cap. Requires a beveled washer when used on angled stair connections. Typically paired with either a Fixed Cap End or another Cap End Turnbuckle. When measuring for assemblies, the outside bearing face of the termination post is the measure point.

Ball End Turnbuckle
Secured to an end post using a small screw-on ball. The ball pivots to allow angled stair connections without beveled washers. Most commonly paired with either a Fixed Ball End or another Ball End Turnbuckle. When measuring for assemblies, the outside bearing face of the termination post is the measuring point.
Tension Adjustment Fittings, cont'd...

**In-Line Turnbuckle**

Used in the middle of a cable assembly to provide additional tensioning capability on either extremely long cable runs or on runs where tensioning at the ends is not feasible. In-Line Turnbuckles can be combined with any style of Fixed End or Tension Adjustment Fitting. When measuring for assemblies using In-Line Turnbuckles, the center of the turnbuckle is the measure point for specifying its position within the cable line.
Some turnbuckles have a crimp sleeve hidden inside the body allowing a shorter turnbuckle design with clean lines and no exposed threads or swaged ends. These turnbuckles are best suited for attaching to the cable in the field using a special crimper tool.
Tension Adjustment Fittings, cont'd...

Threaded Terminal
Popular because it’s small, unobtrusive, and less expensive. Attaches to an end post through a drill hole and is secured and tightened with a washer and nut; a beveled washer is added when doing angled stair connections. Typically used in pairs. When measuring for assemblies, the outside bearing face of the termination post is the measure point.

Internal Thread Adjuster
Has female threads and is secured to an end post with a washer and Allen Head bolt; tension is adjusted by spinning the bolt. Requires a beveled washer for angled connections. Typically used in pairs. When measuring for assemblies, the outside bearing face of the termination post is the measure point.
Attaching Fittings to Cable

There are four standard methods for attaching fittings to the cable:

- Mechanical Compression (done in the field).
- Automatic-Locking Quick-Connect® (done in the field).
- Hand Crimping (done in the field).
- Machine Swaging (done at the factory).
Attaching Fittings to Cable, cont’d...

Mechanical Compression Fittings
- Can be attached in the field.
- Attaches to cable using wedges that are inserted manually and locked with a conical nut.
- More expensive, bulkier in appearance, and more time consuming to assemble.

Automatic-Locking Quick-Connect®
- Can be attached in the field.
- Spring-loaded embossed jaws automatically lock-on when the cable is inserted.
- No special tools are required.
- Fastest, easiest field installed fitting.
Attaching Fittings to Cable, cont’d...

Hand Crimp Fittings
• Can be attached in the field.
• Requires special crimping tool.
• Leaves multiple visible crimp marks on the shaft of the fitting.
• Less strength than other methods.
• For 1/8” and 3/16” diameter cables only.

Machine Swage Fittings
• Attached at factory using rotary or hydraulic cold-forming press.
• Most common attachment method.
• Leaves round or hexagonal shape on the shaft of the fitting.
• Very strong, attractive.
• For all cable sizes.
Custom Cable Installation
Frame Design

As discussed earlier in the course:

- Railing frames must be strong enough to meet code and support the tension loads of the cables.
- Frames and posts can be designed to use cables more efficiently, saving materials, time, and money.
- Frame requirements are the same when using custom assemblies or prefabricated cable assemblies.
Determining Cable Assembly Lengths

Three simple Steps:

• Identify cable termination posts. In most cases cables must be terminated at single corner posts. With double corner posts, however, cables can either be terminated or strung continuously. Be sure to not exceed the recommended maximum run lengths.

• Select cable fittings. The type of fittings used will establish how the cables attach to the termination posts and where the corresponding “measure points” are located (refer to the diagrams below and on the fittings slides).

• Measure the runs between “measure points” on the termination posts to calculate the final “measure lengths” (fabrication lengths) for the cable assemblies.
Attaching & Tightening the Cables

1. Fabricate assemblies by cutting cable and attaching fittings (when using field installed fittings only).
2. Lace cable assemblies through the intermediate posts.
3. Secure end fittings to the termination posts.
4. Adjust tension in the line (depends on fittings used—see diagram below).
5. Trim any excess material (applies to threaded terminals only).
6. Apply finishing end caps (applies to threaded terminals only).

![Diagram of cable installation and adjustment](image)
Angled Terminations

Certain attachment conditions, such as those on stair end posts, may require the cables to terminate at an angle. In these cases, beveled washers or pivoting fittings must be used. The drawings on this slide offer details of such angled connections.

Note that jaw, surface mount, cap end, and ball end turnbuckles would be attached in the same manner as shown for their fixed end counterparts.

Typical Angled Terminations

A. Internal Thread Adjuster with beveled washer.
B. Threaded Terminal with beveled washer and end cap.
C. Threaded Terminal with beveled washer, hex nut, and cap nut.
D. Fixed Cap End with beveled washer.
E. Fixed Ball End.
F. Quick-Connect® fitting with beveled washer and cap.
G. Fixed Jaw End attached to welded tab.
H. Fixed Surface Mount bolted to post face.
I. Fixed Lock Toggle.
Wood Railing Details - Corners

Depending on the configuration of the wood corner posts, custom assemblies can either run continuously through the corners or terminate. Corner details will depend on the type of end fittings used. Surface Mount and Jaw type fittings attach to the face of a post whereas all other fittings require a through-post hole for attachment.
Metal Railing Details - Continuous Corners

On metal frames, both continuous and terminating options are available depending on the configuration of the corner posts. The drawings on this page show options for running the cable continuously.

- Double Pipe
- Double Flat Bar
- Single Flat Bar
- Angle Iron

Note: the details shown for round pipe would also apply to square and rectangular tube posts.
Metal Railing Details - Terminating Corners

Termination details for metal corner posts also depend on the type of end fittings used. Surface mount and jaw type fittings attach to the face of a post whereas all other fittings require a through-post hole.
Exterior Applications - Custom Cable Assemblies
Interior Applications - Custom Cable Assemblies
Summary

Today's cable railing assemblies offer infill options that are durable, versatile, attractive, low maintenance, easy to use, and virtually invisible; perfect for projects with a view. They can be used for exterior or interior applications; residential or commercial projects; configured to meet specific design needs; and used on wood or metal frames or structures. Note, the cables and fittings discussed in this presentation should never be used for lifting, hanging, or other high load conditions; the manufacturer can recommend other cables and components for these types of critical applications.

Railing frames need to be designed and constructed so that they utilize cables efficiently, satisfy code spacing requirements, and support the loads exerted by taut cables. Using double corner posts allow the cables to run continuously so that fewer assemblies and fittings are needed, thereby reducing material and installation costs. Posts or verticals must be spaced no more than 3-feet apart and the cables 3-inches apart so that the lines will not deflect past the 4” code spacing requirement. And for strength, the posts must be properly sized and securely attached to the deck structure as well as to a rigid top rail.
Cable assemblies can be divided into two main categories: Prefabricated Cable Assembly Kits and Custom Cable Assemblies.

Prefabricated Cable Assembly Kits are standardized by Feeney, Inc. and contain all of the components, fittings, hardware, and accessories necessary to assemble and install a cable railing infill. The kits use 1/8”, 3/16” and 1/4” diameter cable and are typically available in a wide range of standardized pre-cut lengths with a predetermined pair of end fittings for easy ordering. Any excess cable is trimmed in the field so exact railing measurements are not necessary when ordering. In addition, smaller drill holes and special easy-to-use fittings make these cable railing assembly "kits" quick and easy to install without using any special tools.

Custom Cable Assemblies, on the other hand, incorporate a wide assortment of sizes and styles of cables and fittings to meet the specific design and function needs of unique railing designs. Custom cables and components can either be ordered individually for fabricating assemblies at the jobsite or as complete made-to-measure assemblies directly from the factory, ready to install. Manufacturers can assist with product selection and assembly designs.
Two basic types of cable fittings: Fixed Ends and Tension Adjustment Fittings. 

Fixed Ends, sometimes referred to as “dead end”, are non-adjustable end termination fittings that have no tensioning capabilities. 

Tension Adjustment Fittings include the threaded terminals, turnbuckles and adjusters that are used to tighten the cable lines. Every cable assembly must have at least one Tension Adjustment Fitting.

Fittings can also be categorized by how they attach to the cable. Mechanical Compression Fittings are attached in the field and have wedges that are manually inserted into the end of the cable and then compressed with a conical nut to lock the fitting onto the cable. Automatic-Locking Quick-Connect® Fittings are the fastest and easiest field attached fittings and have spring-loaded embossed jaws that automatically grip the end of the cable when it’s inserted into the fitting. Hand Crimp Fittings are also applied in the field and use a special crimping tool to compress the shank of the fitting onto the cable. Machine Swage Fittings are perhaps the most common style, and they are attached to the cable at the factory using either a rotary or hydraulic-cold-forming press.
Summary, cont’d...

Building codes vary by city and county, so before starting a project, be sure to consult your building department to see if there are any local requirements for using and installing cable railings. Also, review all of the manufacturer's installation instructions, frame requirements, and fitting details, and don’t hesitate to give the manufacturer a call if you need assistance or have any questions.
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