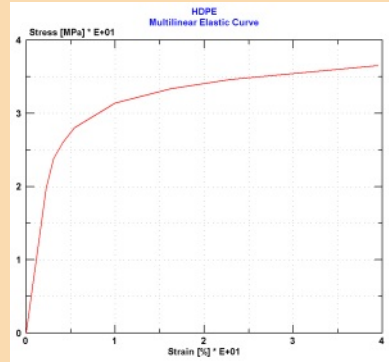
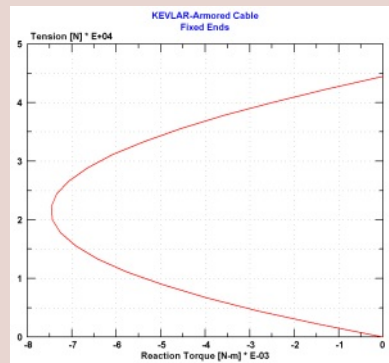


CableCAD®



Nonlinear material behavior can be modeled with a multilinear elastic curve.

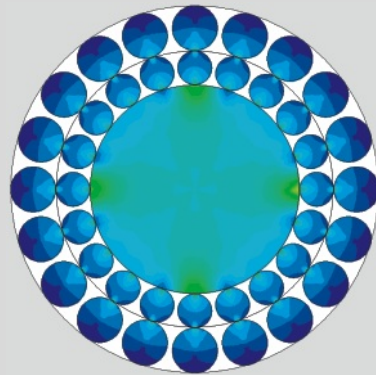


Torque balance can be achieved by having the program automatically iterate the lay angle of an armor layer.

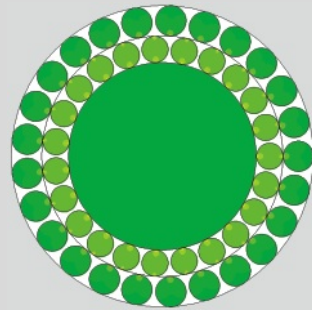
Design Optimization

Since CableCAD allows easy geometry modification, cable designers can study many design options under different load cases. These studies will enable your designers to optimize cable size and weight and lower your material costs. The simple example below shows how a lighter, more economical cable can be designed to carry the same maximum tension safely.

CableCAD does not replace cable testing. In fact, CableCAD results can be used to improve testing by identifying critical areas of the design that should be fully tested. Tests will be more efficient saving development time and increasing product reliability. By using CableCAD you can save time and money while improving your product quality!



Original Design
Armor Factor of Safety=4
Armor Material: SXIPS
O.D.=12.9 mm
Weight=1,174 kg/km



Optimized Design
Armor Factor of Safety=2
Armor Material: IPS
O.D.=11.8 mm
Weight=1,057 kg/km

FINITE ELEMENT

Software for Structural Design and Analysis of Cables and Wire Ropes



STRUCTURAL SOLUTIONS

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Licensing

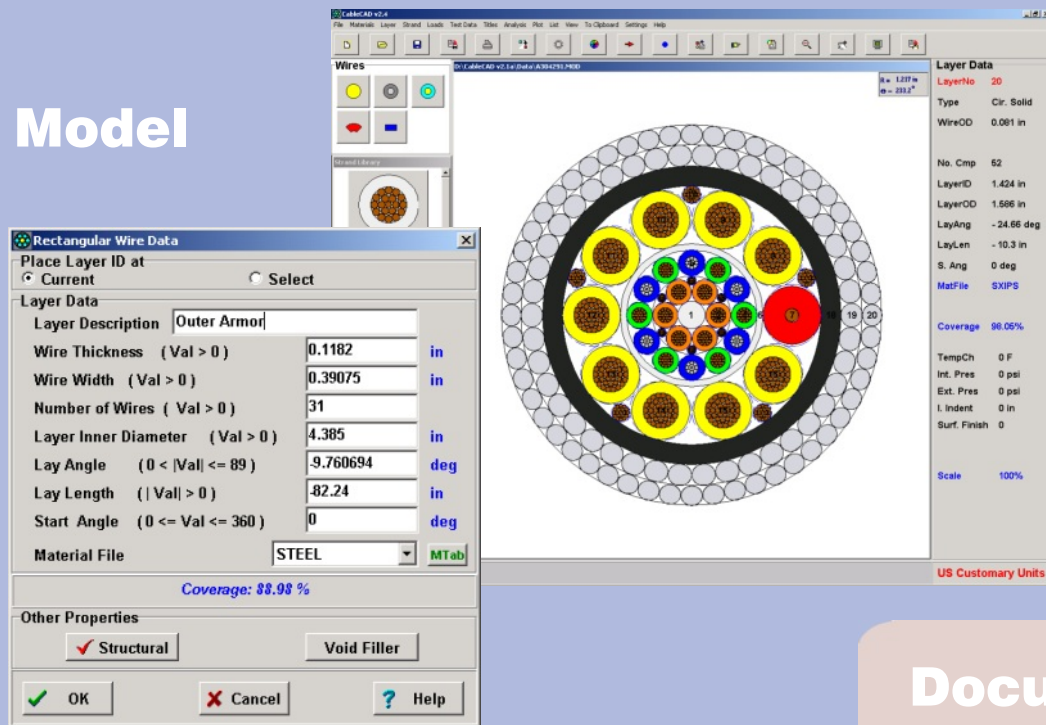
Join companies like Nexans, Prysmian, Petrobras, Oceaneering Multiflex, Schlumberger, General Dynamics, NSW, Global Marine Systems, LS Cable, Rochester Cable and OYO Geospace and experience the power of CableCAD! Call our office or send email to sales@cablecad.com for current pricing. CableCAD is offered with a perpetual license. Multiple license discounts are available. CableCAD® Designer™ is an economical alternative that provides the same geometrical modeling capabilities as CableCAD without structural analysis.

www.cablecad.com

Please visit our website to learn about additional capabilities of this unique software for cable design and analysis. Take a tour of the program by viewing our online demos.

Developed specifically for cables, CableCAD® creates precise cable layouts and enables rapid structural modeling of complex cable designs.

Model

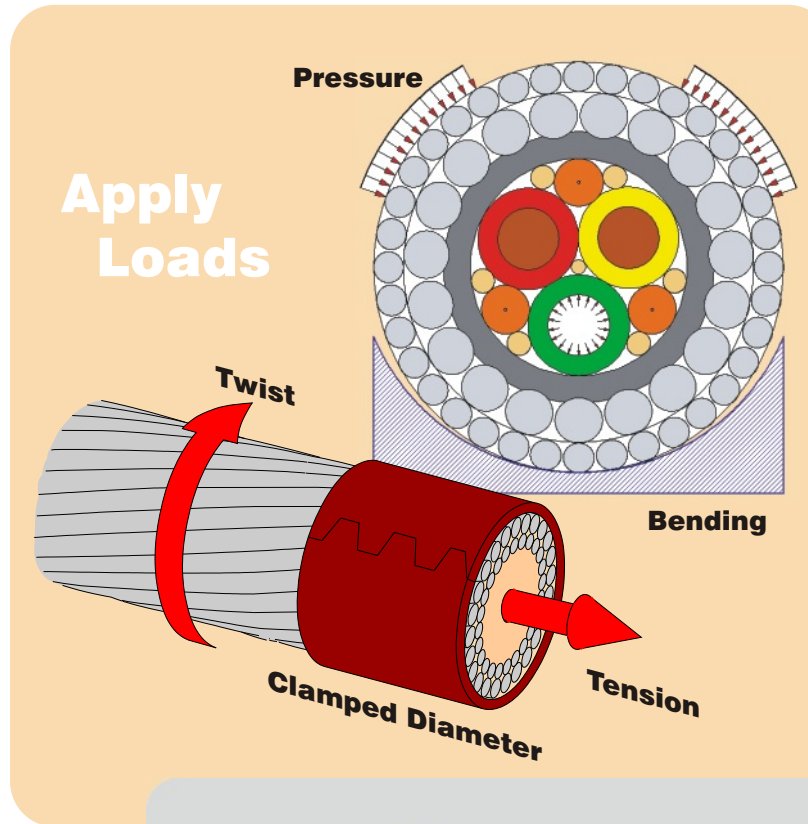
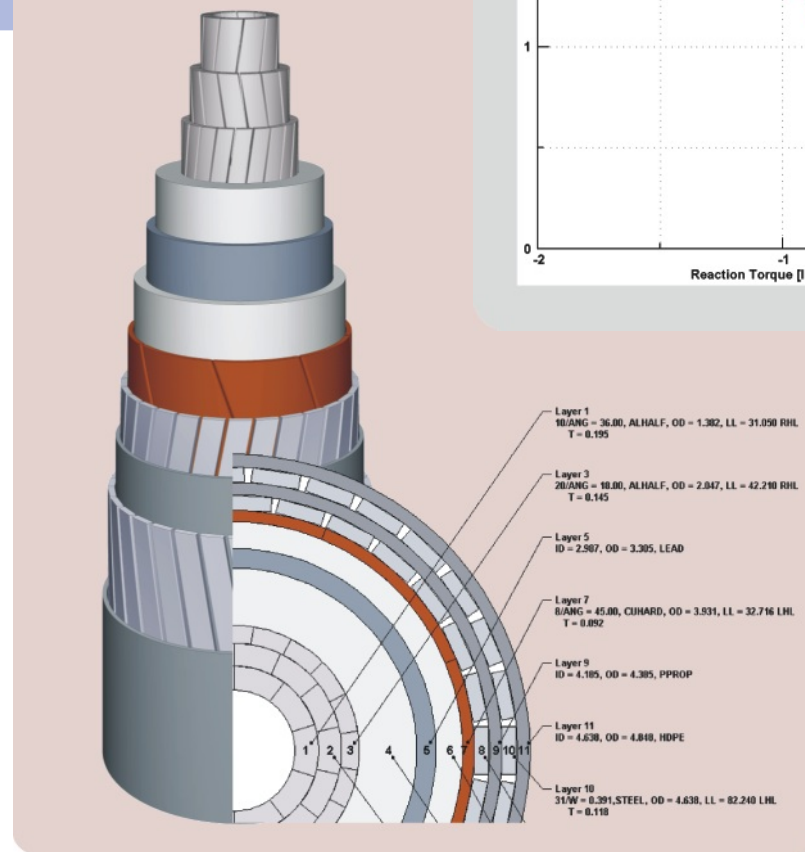


Modeling

Sure, you could use a general purpose CAD program to layout your cable designs. You would create your layout with circles, arcs, ellipses and lines. Or, if you really love a challenge, you could create 3D layouts with helical surfaces or solids. If you're adept at programming you may even write macros to automate some of the geometry creation. But, even when you become proficient at creating your layout you'll probably still find that you spent too much time being a CAD operator instead of a cable designer.

CableCAD offers a better solution. With CableCAD, users create a cross-sectional layout a layer at a time using five wire types or any user-created strand. So, instead of manipulating ellipses and lines, the designer simply specifies the number of wires, wire geometry, lay length (or angle) and wire material for each layer. The familiar Windows interface and intuitive menus make the program easy to learn and use. An exact wire coverage formula ensures that wires fit properly in the layer. Meshed layers are built by dragging and dropping a wire into an interstitial space in existing layers. Any model can be stored in a strand library and later recalled as a component in a new cable model. CableCAD allows users to concentrate on cable design instead of geometry creation.

Document



Loads

The cable designer can simulate test or operational conditions by applying the following types of loads:

- Axial tension
- Twist
- Free bending or bending over a sheave (with friction)
- Full or partial external pressure
- Component internal pressure
- Clamped cable diameter
- Thermal loads

These loads can be applied alone or in any combination. The bending over sheave load case considers contact pressure from the cable-sheave interaction and the shape of the sheave groove (circular or vee).

Analysis

Cables are complex structures made up of helical components, various wire shapes and a wide range of materials. These constructions often require structural analysis that challenge the capability of the average cable designer. CableCAD comes to the cable designer's aid with the power of structural finite element analysis (FEA).

You do not have to become a FEA specialist to use CableCAD. Its finite element modeler is transparent to the user since the program automatically creates a finite element mesh for the cable model. To perform a FEA, simply define a load case and click the run button. Results are available in minutes. These results give the designer unprecedented insight into the structural performance of the cable. The designer can quickly perform parametric studies by varying parameters such as wire size, lay lengths and material selection.

While performing an analysis is simple, the analysis model is comprehensive. Geometrical and material nonlinear effects such as large deformations, nonlinear stress-strain curves, wire indentation into adjacent cylindrical layers and circumferential layer locking are included in the model. Bending analysis considers frictional forces to predict stress relaxation due to wire

slip and can include the contact pressure from bending over a sheave. Color-coded stress contour plots and X-Y graphs provide rapid assessment of cable behavior. A scaled plot of the deformed cable cross-section also can be viewed. Contact forces between components can be evaluated easily with a nodal force plot. Test data can be entered so that physical test results can be compared easily with CableCAD analysis results. The automatic torque balance feature iterates the lay angle of a user-selected layer to achieve a minimum torque solution. CableCAD provides easy-to-use, but thorough structural analysis.

Documenting

Both materials and individual components can be color-coded to produce realistic images. The 3-D shaded image plot and layer description plot are just mouse clicks away as they are created automatically from the model definition. All plots and graphs can be exported easily to other Windows applications for creating eye-catching design reports, manufacturing instructions or sales material.

Analyze

