



**Polywater**<sup>®</sup>  
PULL-PLANNER 4.0<sup>™</sup>

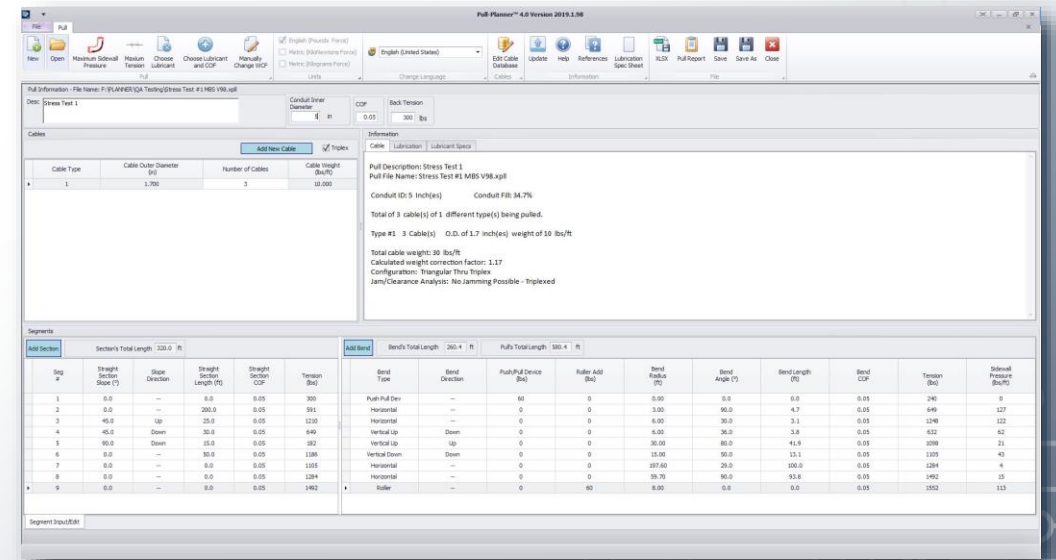
Overview of Pull-Planner 4.0 Program and Capabilities

# What is the Pull-Planner software?

The Pull-Planner is a customized software program developed to support engineers, designers, and project managers.

- ◆ Utilizes an intuitive interface to input raceway design, calculate tension and sidewall pressure, and test design modifications.
- ◆ Leverages industry standards and Polywater's own body of research.
- ◆ Stores a personalized database of cable specifications and pull data.

Pull-Planner 4.0 pull report



Pull-Planner 4.0 Version 2019.3.08

File Name: P:\PLANNER\QA Testing\Stress Test #1 MBS V08.apl

Doc: Screen Test 1

Cable Information: Cable Outer Diameter: 3.750, Number of Cables: 3, Cable Weight: 30.000

Information: Pull Description: Stress Test #1, Pull File Name: Stress Test #1 MBS V08.apl, Conduit ID: 5.000 inch(es), Conduit Fill: 34.7%, Total of 3 cable(s) of 1 different type(s) being pulled, Type #1: 3 Cable(s) O.D. of 3.750 inch(es) weight of 30 lb/ft, Total cable weight: 30 lb/ft, Calculated weight correction factor: 1.17, Configuration: Triangular Thru Triplex, Jam/Clearance Analysis: No Jamming Possible - Triplexed

Seg #	Straight Section Length (ft)	Slope Direction	Straight Section Length (ft)	Straight Section COP	Tension (lbs)	Bend Type	Bend Direction	Push/Pull Device (lbs)	Roller Add (lbs)	Bend Radius (ft)	Bend Angle (°)	Bend Length (ft)	Bend COP	Tension (lbs)	SideWall Pressure (lbs/ft)
1	0.0	---	0.0	0.05	300	Push/Pull Dev	---	60	0	0.00	0.0	0.0	0.05	240	0
2	0.0	---	200.0	0.05	391	Horizontal	---	0	0	3.00	90.0	4.7	0.05	649	127
3	45.0	Up	25.0	0.05	120	Horizontal	---	0	0	6.00	30.0	3.1	0.05	1246	122
4	45.0	Down	30.0	0.05	649	Vertical Up	Down	0	0	6.00	30.0	3.8	0.05	612	62
5	90.0	Down	15.0	0.05	302	Vertical Up	Up	0	0	30.00	30.0	11.8	0.05	2038	71
6	0.0	---	30.0	0.05	1396	Vertical Down	Down	0	0	15.00	30.0	15.1	0.05	1105	43
7	0.0	---	0.0	0.05	1105	Horizontal	---	0	0	297.60	29.0	100.0	0.05	1294	4
8	0.0	---	6.0	0.05	1294	Horizontal	---	0	0	39.30	30.0	9.3	0.05	1462	15
9	0.0	---	0.0	0.05	1462	Roller	---	0	90	0.00	0.0	0.0	0.05	1552	113

Segment Input/Output

# Integrating the Pull-Planner into project design & pre-planning

The Pull-Planner optimizes your cable pull by:

- ◆ Providing a best-in-class technical resource that improves the accuracy of complex, large-scale cable pulling projects.
- ◆ Simplifying pull tension calculations, while helping to anticipate and navigate challenges and providing documentation.
- ◆ Recommending optimized cable-pulling lubricant quantity.
- ◆ Offering a range of coefficients of friction based on conduit, cable jacket, and lubricant information entered.

*The Pull-Planner is a beautiful thing that has made my job easier by doing the hard work of calculating pull tension and generating my pull plan for long pulls with heavy wire. I've worked closely with the Polywater team for nearly 20 years, and they are consistently my go-to source of knowledge and resources.*

**- Chuck Baird, Owner,  
Alaska Line Builders LLC**

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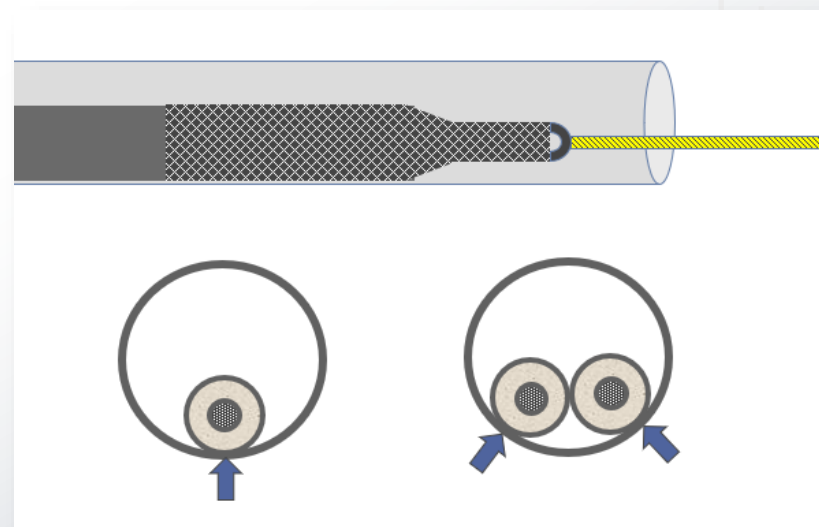
# What is the coefficient of friction (COF)? Why is it important?

## What?

- ◆ COF is the most important variable in calculating tension. It accounts for cable and conduit type and condition, temperature, normal pressure, cable fill, number of bends, and other field factors.

## Why?

- ◆ Reliable COF calculations help you optimize pull resources and safety and think through “what if scenarios” to reduce splices, vaults, and pulling equipment set-ups, while avoiding damage to cables and ensuring network performance.



# What are the key capabilities that the Pull-Planner offers?

- ◆ Utilizes Polywater's extensive COF database developed from years of hands-on testing using real cables, conduits, and lubricants. We combine industry best practices with our hands-on testing method.
- ◆ Accommodates different pull methods and field conditions—variable friction, rollers, pull reverse, back calculation, push/pull devices, and more.
- ◆ Approaches a pull segment by segment. The 4.0 version separates straight runs from bend segments and allows users to input and view every segment on one screen, making it even more user friendly.

