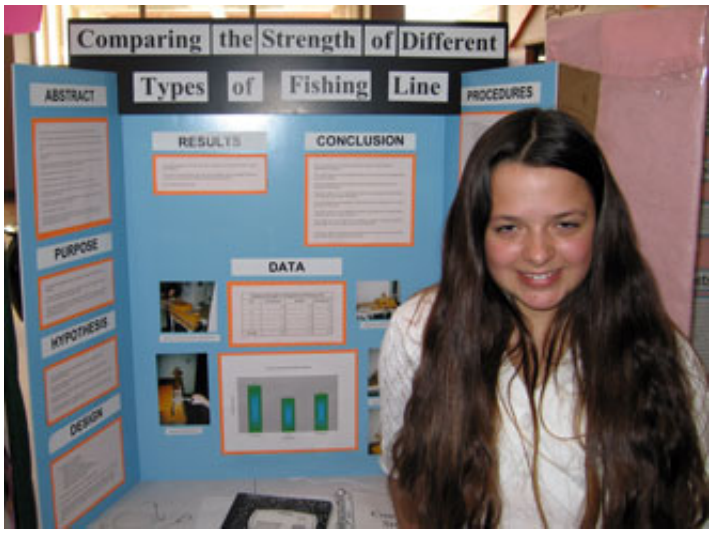
Comparing the Strength of Different Types of Fishing Line



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PURPOSE

The purpose of this experiment was to compare the strength of different types of fishing line.

I became interested in this idea because my father loves to go fishing and just about every time his line breaks and he looses the fish.

The information gained from this experiment could benefit society because it would tell if 50 pound test could really hold up to 50 pounds. My study would tell just how many pounds the lines could hold.

HYPOTHESIS

My first hypothesis was the Braided Fishing line would be stronger than the Monofilament fishing line.

My second hypothesis was Microfilament fishing line would be stronger than the Monofilament fishing line.

My third hypothesis was Monofilament fishing line would be the weakest line out of all of the types of line tested.

I based my hypothesis on information on the Internet about fishing line. The sites said that the less the stretch the better the line is.

EXPERIMENT DESIGN

The constants in this study were:

- Type of Knot used (Palomar)
- Diameter of line used
- Testing device, all components
- Testing done at room temperature
- Speed at which gained tension was applied
- The procedure in which line was attached to winch
- Indicator calculates in kilograms

The manipulated variable was type of fishing lines used.

The responding variable was the force needed to break the different type of fishing line.

To measure the responding variable I made a device that increased line tension and transferred the force to the load cell. The load cell then sent information to the indicator. The indicator then displayed the force in kilograms from zero to breaking point.

MATERIALS

QUANTITY	ITEM DESCRIPTION
96''	11/4''x1/4'' flat bar steel
49''	3''x3''x1/4''
10''	13/8'' Sch. 40 pipe
1	3/8"x41/2''carrage bolt with nut
1	1/2''x9''carrage bolt with nut
4	5/16''x1''grade 8 bolts with nut
1	1500 lb oat wench
1	500 lb s-type load cell
1	Idicator 1000 lbs.
450'	Monofilament fishing line 50pound
450'	Braided fishing line 50pound
450'	Fluorocarbon Fishing line 50pound
1	Fishing hook
2	Cans of primer

2	Cans of caterpillar yellow paint
1	1/2''x3/4'' fine thread bolt
4	2x4x8 number 2lumber
3	1x6x6 cedar fencing
4	2'' hinges
2	caster wheels
4	table leg supports
2	barrel bolts
3 lbs.	Deck screws
1	10'' metal fiber cutting blade
1	10'' compound miter saw
2 lbs.	.030 Mig. Welding wire
1	Wire feed Mig. Welder
2	6'' handles
1	5/16'' drill bit
1	3/8'' drill bit
1	1/2''drill bit
1	4'' grinder

PROCEDURES

1. Build testing device
a. Get a 1.2 cm. solid, long piece of metal.
b. Put on safety glasses.
c. Put on leather gloves.
d. Measure 15 cm three times in the metal and mark at 15 cm.
e. Measure up the mark at the 15 cm to the saw blade.
f. Turn on the saw and cut the metal in the three spots you marked it.
g. Turn off the saw.
h. Weld two of the pieces of metal together in the center on the long side.
i. Put on your welding helmet so you don't hurt your eyes.
j. Put on a leather, welding chest and arm coat.
k. Weld third piece in center where you had already welded the other two.
l. Weld the third piece on the long side.
m. Weld it sitting up on its side.
n. On the metal tube cut a 1.27 cm wide cut in it.
o. Cut it in a straight line.
p. Smooth out the edges and the sharp pieces of metal where you had cut the straight 1.27 cm wide cut.
q. Fit the half, inch wide cut to be just wide enough so that the metal piece you made in step eight has a little extra space to slide.
2. Tie the Palomar knot
a. Double about 5 inches of line, and pass through the eye.
b. Tie a simple overhand knot in the double line, letting the hook hang loose. Avoid twisting the lines.
c. Pull the end of loop down, passing it completely over the hook.

d.

Pull both ends of the line to draw up the knot.
3. Cut each type of fishing line at 152 cm.
4. Conduct trials.
a. Take the fishing line.
b. Put fishing line in the hole in winch that has an indent in it that is facing the bar at the end of the device and tie a knot in it so it doesn't slip out.
c. Turn the winch forward so there are two loops all the way around it then put the line in the middle of the two and go around it only one time.
d. Tie the Palomar Knot in the middle of the fishing line at end of the fishing line tie it off on the solid metal triangle holding the bar.
e. Switch the scale to measure kilograms.
f. Turn the winch slowly while carefully reading the force on the indicator until the line breaks.
g. Record the data.
h. Repeat 4a-g with same type of line 4 more times.
5. Record all the data.
6. Average all trials for each knot type.
a. Add all the data for one type of line and the divide it by five, because that is how many recordings there should be
b. Repeat 5-6b with each type of fishing line.

RESULTS

The original purpose of this experiment was to compare the strength of different types of fishing line.

The results of the experiment were that the Monofilament was the strongest fishing line I tested. To my surprise the Braided fishing line was the weakest.

See the table and graph below.

CONCLUSION

My first hypothesis was the Braided Fishing line would be stronger than the Monofilament fishing line.

The results indicate that this hypothesis should be rejected because the Braided fishing line was the weakest

My second hypothesis was Microfilament fishing line would be stronger than the

Monofilament fishing line.

The results indicate that this hypothesis should be rejected because the Monofilament fishing line was the strongest line tested.

My third hypothesis was Monofilament fishing line would be the weakest line out of all of the types of line tested.

The results indicate that this hypothesis should be rejected because the Monofilament fishing line was the strongest line tested.

After thinking about the results of this experiment, I wonder if the type of knot used would change the results of the strength of the fishing line.

If I were to conduct this project again I would do more trials and make sure I used the same amount of line for each type of fishing line.

RESEARCH REPORT

Introduction

Breaking strength refers to the force the fishing line breaks at.

Fishing Line

Stiffer line works well on reels made for bait casting. Stiffer lines hold the shape of the spool more. Braided fishing line has most of the same qualities as Microfilament fishing line. Both lines are waxed and very thin. All Microfilament fishing line is a super-braid. Unlike Braided and Microfilament fishing line Monofilament fishing line is thick and feels like plastic or rubber. Monofilament fishing line has a lot of stretch and is harder to tie in a knot.

Monofilament Fishing Line

Monofilament line stretches. Line stretching can be bad or good. Stretch makes line more forgiving if you put a lot of force on the line. Monofilament fishing line is much harder to set a hook in because it is thicker than other types of fishing line. Most fishing lines are waxed with a thin layer.

Braided Fishing Line

Braided fishing line is said to be so strong that you should make sure your rod is able to handle it. Cutting braids can be tough. Most fishermen just carry around clippers and cut line with that but with braided fishing line they have to carry around scissors to cut it.

Hooks

Hooks are made of strong metals like steel and iron to maintain the strength and sharpness. Hooks are used for mainly fishing. They are fairly strong and they won't bend under most high pressures. There are many different types of hooks. There are hooks made for different types of fish depending on how strong the fish is.

Testing Device

The testing device used for this experiment was made by my father and I. It is caterpillar yellow and has a 500 lb boat wench attached to it and a load cell and monitor that calculates how much strength it takes to break the fishing line in kilometers or pounds.

Summary

Fishing line is used all over the world. It is used mainly for fishing but some people use it for more than that and sometimes have to rely on fishing line to do the job they want to accomplish. Fishing line is either very thin or thick depending on what it is made of.

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