When high-modulus rods break, the fault usually lies in how they're handled. (See page 73 for the "before.")

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GEAR GUIDE

GRAPHITE ARTISTS

Understanding the Writing on the Wall About Rod Materials

Shop around for a new fishing rod, and you might get lost in a jungle of jargon like "IM8" and "high-modulus graphite." In a marketing environment that seems long on buzzwords and short on definitions, how does all this translate into on-the-water performance?

While important, the type of graphite and its modulus rating shouldn't be your only criteria when choosing rods.

IM CONFUSED

Questions about IM designations and modulus ratings abound on Internet fishing forums, and some answers frequently posted by well-meaning but woefully misinformed anglers only serve to perpetuate myths and misconceptions.

IM6, IM7 and IM8 are trade names for different types of carbon fibers (graphite) produced by Hexcel Corporation. The letters "IM" stand for "intermediate modulus." The numbers do not represent any industry standard or measure of quality. For example, IM8 is not "better" than IM6; the two simply possess different characteristics.

"Some of what you see is a name game," says Tom Kirkman, publisher and editor of *RodMaker* magazine (the world's leading publication for custom rod builders; rodmakermagazine.com). "IM6 fiber may appear in one manufacturer's rods as 'Special T6' and as 'Magna40 Graphite' in another's." Kirkman's experience includes 30-plus years as a custom rod builder and more than 20 as a consultant to major rod manufacturers.

Jimmy Green crafted the first graphite rods at Fenwick in 1974 using carbon fiber with a modulus of about 33 million. "In those early days of graphite rod making, it was hard to climb the ladder to even higher-modulus graphite because as the modulus increased, the strain rate decreased," Kirkman says. "Put simply, the higher-modulus material was stiffer but more brittle."

In the mid-1980s this paradigm shifted when Gary Loomis unveiled the first rods made from IM6. "For the first time it was possible to produce lighter, more sensitive rods without losing durability due to brittleness, because IM6 had a higher modulus as well as a higher strain rate," Kirkman says. "Most high-modulus graphite fibers used in blanks today have a greater modulus and strain rate than IM6."

PHOTOS: (TOP) DOUG OLANDER, (LEFT) CHRIS WOODWARD

MODULUS OPERANDI

When specifying the modulus of graphite used in their rods, manufacturers bandy about figures in the millions like sportscasters reporting on a superstar's contract negotiations. Hexcel lists these modulus ratings for its products: IM6, 40.5 million; IM7, 40 million; IM8, 44 million. Graphite touted as high modulus (sometimes called HM) typically rates 54 million or higher.

These spools of carbon fiber, produced by Hexcel Corporation, will be transformed into prepreg — graphite "cloth" impregnated with resin — for making fishing rods.

PHOTO: COURTESY HEXCEL CORPORATION / HEXCEL.COM

Contrary to one popular belief, modulus does not refer to the number of fibers in a material. IM6, IM7 and IM8 fibers have the same number of filaments (12,000) and identical weights (0.45 grams per meter).

As applied to fishing rods, we can define modulus (or modulus of elasticity) as a measure of the material's stiffness. The higher the modulus the stiffer the material, and in turn, the carbon fiber's rigidity can affect rod weight. Assuming they have identical designs, a rod made from IM6 will be heavier than one made from IM8, because it takes less of the higher-modulus graphite to achieve the same degree of stiffness. Or if two rods weigh the same, the IM8 will be stiffer than the IM6 rod.

"Provided it will hold up to the task at hand, a lighter rod is a better rod," Kirkman says. "A lighter rod improves sensitivity, because it more effectively transmits vibrations telegraphed up the line. Less weight creates less inertia when starting and stopping the casting stroke, making the rod more efficient and responsive."

Kirkman suggests trying an experiment to demonstrate the effect of additional weight on rod performance: Take a light spinning rod and wrap a few inches of lead wire somewhere on the upper half of its length, the closer to the tip the better. "Cast with the rod," he says. "Shake it a bit; feel it. Now remove the weight and do the same movements. You'll notice that without the added weight, the rod responds much more quickly. It's more pleasant to fish with. This efficiency, or response, is described by rod builders as 'speed.' The higher the speed, the quicker the rod reacts and recovers. Higher-modulus rods are generally lighter than lower-modulus rods of the same stiffness and, therefore, are more responsive."

BREAKABLE, NOT BRITTLE

The next time some know-it-all tells you high-modulus rods are brittle, play myth buster and explain the difference between "brittle" and "fragile." Years ago, yes, many graphite rods shattered because of brittleness. Today's high-modulus graphite, however, boasts a better strain rate than the early stuff. In other words, it's stronger.

A worker at the St. Croix Rod factory in Wisconsin cuts prepreg.

PHOTO: COURTESY ST. CROIX ROD / STCROIXRODS.COM

So why do rods break? The increased stiffness of high-modulus graphite allows manufacturers to build rods with less material, which translates into blanks with thinner walls. "Most modern high-modulus rods aren't brittle, but they do possess thinner walls than those of several years ago," Kirkman says. "Although designed to offer the highest possible level of overall performance while still delivering adequate durability, thinner walls can't take the impact that thicker ones will without suffering damage."

When high-modulus rods break, the fault usually lies in how they're handled. Getting smacked by sinkers or lures, rattling around in a travel tube or rolling about on the deck can prove fatal to these delicate instruments. "You must give up one thing in order to get another," Kirkman says. "With a high-modulus rod, you lose the ability to beat and bang the thing around but gain a much more efficient fishing tool."

PUTTING IT ALL TOGETHER

Higher-modulus rods tend to be lighter and more responsive but a bit less durable than rods made from lower-modulus fibers. Kirkman advises anglers to decide on their priority — performance or durability — and then choose their weapon accordingly.

Don't look only at the material without considering how manufacturers employ it. While the material defines how far you can go in any direction, a rod's design and structure determine its action and power. "Let's make two different rods from equal amounts of IM6: one with a large-diameter, thin-wall design; the other with a small-diameter, thick-wall design," Kirkman says. "The two blanks are made from identical material and weigh exactly the same, but the former will be stiffer and more responsive than the latter, although the latter will be far more durable."

The type of graphite, though important, represents just one of many factors that influence a rod's qualities. As Kirkman says: "Any fisherman who bases rod-buying decisions on modulus numbers alone does himself a disservice. There's a lot more to rod performance than modulus rating."

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