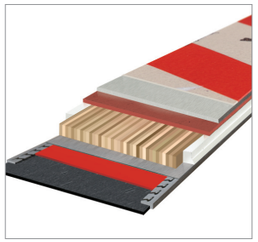
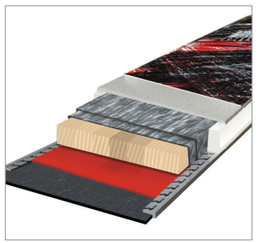
skis (anatomy)

Don't know your pre-preg from your torsion box? And what's so great about vertical sidewalls anyway? Skis have fairly simple constructions, but it helps to understand a few terms and concepts.
By Joe Cutts

BASIC CONSTRUCTION TYPES

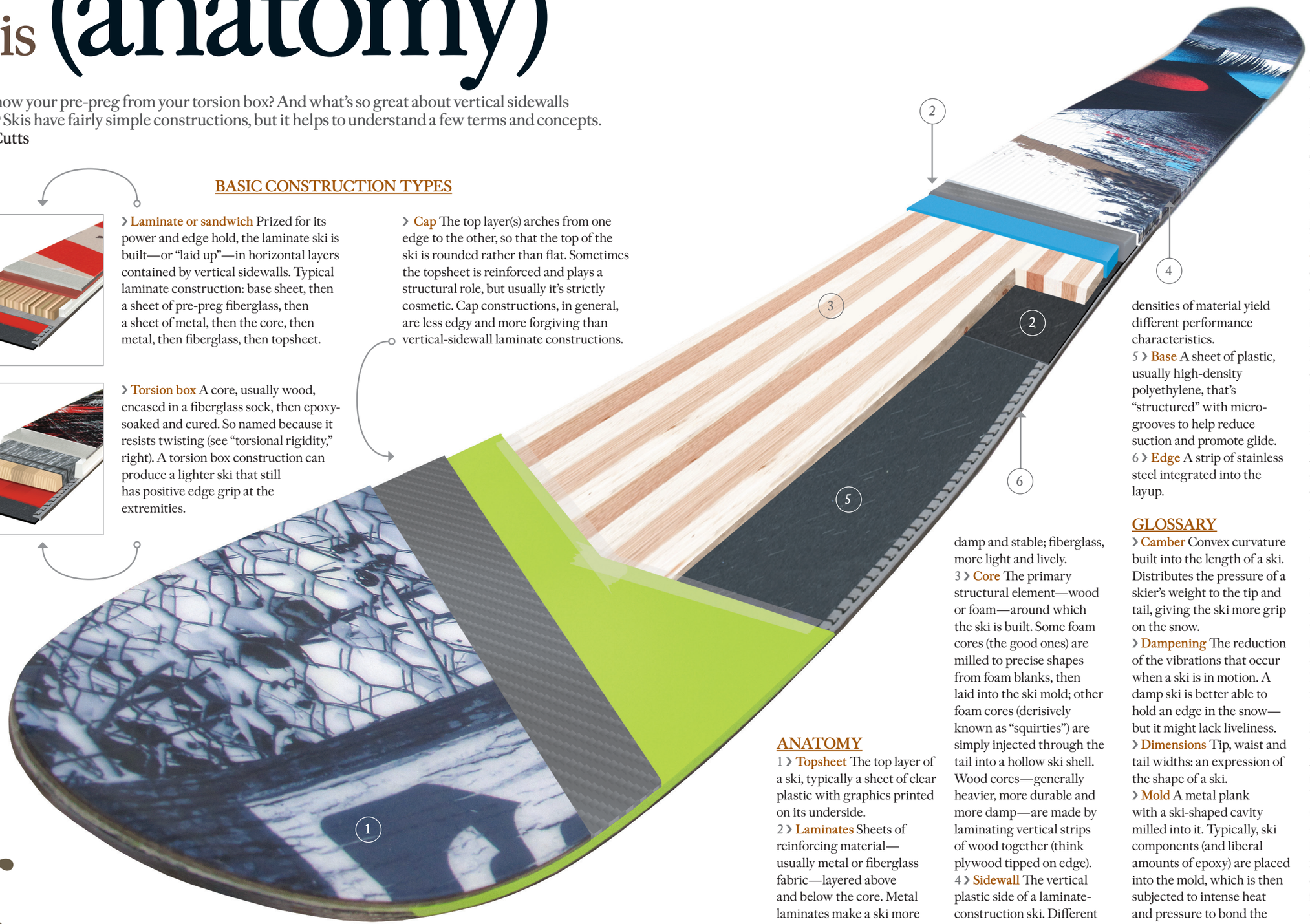


› **Laminate or sandwich** Prized for its power and edge hold, the laminate ski is built—or "laid up"—in horizontal layers contained by vertical sidewalls. Typical laminate construction: base sheet, then a sheet of pre-preg fiberglass, then a sheet of metal, then the core, then metal, then fiberglass, then topsheet.



› **Torsion box** A core, usually wood, encased in a fiberglass sock, then epoxy-soaked and cured. So named because it resists twisting (see "torsional rigidity," right). A torsion box construction can produce a lighter ski that still has positive edge grip at the extremities.

› **Cap** The top layer(s) arches from one edge to the other, so that the top of the ski is rounded rather than flat. Sometimes the topsheet is reinforced and plays a structural role, but usually it's strictly cosmetic. Cap constructions, in general, are less edgy and more forgiving than vertical-sidewall laminate constructions.



ANATOMY

1 › **Topsheet** The top layer of a ski, typically a sheet of clear plastic with graphics printed on its underside.
2 › **Laminates** Sheets of reinforcing material—usually metal or fiberglass fabric—layered above and below the core. Metal laminates make a ski more damp and stable; fiberglass, more light and lively.
3 › **Core** The primary structural element—wood or foam—around which the ski is built. Some foam cores (the good ones) are milled to precise shapes from foam blanks, then laid into the ski mold; other foam cores (derisively known as "squirties") are simply injected through the tail into a hollow ski shell. Wood cores—generally heavier, more durable and more damp—are made by laminating vertical strips of wood together (think plywood tipped on edge).
4 › **Sidewall** The vertical plastic side of a laminate-construction ski. Different densities of material yield different performance characteristics.
5 › **Base** A sheet of plastic, usually high-density polyethylene, that's "structured" with micro-grooves to help reduce suction and promote glide.
6 › **Edge** A strip of stainless steel integrated into the layup.

GLOSSARY

› **Camber** Convex curvature built into the length of a ski. Distributes the pressure of a skier's weight to the tip and tail, giving the ski more grip on the snow.
› **Dampening** The reduction of the vibrations that occur when a ski is in motion. A damp ski is better able to hold an edge in the snow—but it might lack liveliness.
› **Dimensions** Tip, waist and tail widths: an expression of the shape of a ski.
› **Mold** A metal plank with a ski-shaped cavity milled into it. Typically, ski components (and liberal amounts of epoxy) are placed into the mold, which is then subjected to intense heat and pressure to bond the components and squeeze out excess epoxy.
› **Pre-preg** A type of prefabricated laminate used to reinforce cores. Sheets of fiberglass fabric are impregnated with epoxy, cured and then cut to fit the ski's width and placed in the mold.
› **Rocker (reverse camber)** The opposite of camber: The tip and tail curve up off the snow. Makes skis more buoyant in powder and easier to pivot on hardpack.
› **Sidecut** The narrowing of a ski at its waist; aids in turning when the ski is tipped on edge and pressured into an arc.
› **Sidecut radius** A measurement, usually expressed in meters, of the depth of a ski's sidecut curvature.
› **Taper** The difference between the tip and tail widths. A ski with a smaller taper generally initiates arcs easily, resulting in a turnier ride, while a ski with a larger taper is less hooky and easier to skid.
› **Titanal** The brand name of the aluminum alloy commonly used in laminates.
› **Torsional rigidity** A ski's ability to resist twisting, often achieved by aligning glass fibers across the core at an angle (see "torsion box"). By increasing torsional rigidity, a manufacturer can make a lighter, metal-free ski that still holds an edge on hardpack.

ILLUSTRATIONS BY STEPHEN BENESKI