

Ask Jon Eakes

Saw blade safe rotational speeds

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Different saws turn at different speeds. That is because for each material there is an ideal speed of contact between the cutting edge and the material. In general woodworking and renovation we don't pay too much attention to saw speed changes for changes in material, like we must do in drilling holes in metal, glass, ceramic and the like. But for a given rotational speed, the larger the blade, the faster the tooth is moving. In order to get the cutting edge itself to always go through the wood at about the same linear speed, we need to change the rpm or revolutions per minute. That is why routers, with their very small bit diameters, turn at around 30,000 rpm while 10 circular saws are going much slower. In fact, the growing variety of router bit diameters, from under 1/4 inch to large shaper type heads is what has forced the addition of variable speed controls on the routers -- we are always trying to keep that cutting edge at the same linear speed.

Now the question comes up, how fast is safe. If you were to take a 20 inch blade and turn it at 30,000 rpm, you would have the outer edge of this blade moving so fast that the teeth might fly right off the saw. So in fact, there is a maximum safe speed for each size of saw blade. This is not the ideal cutting speed, this is the upper limit of safety. Check out the accompanying table and you will avoid rigging that miter box up beyond safe limits.

Thank you Freud for the chart.

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