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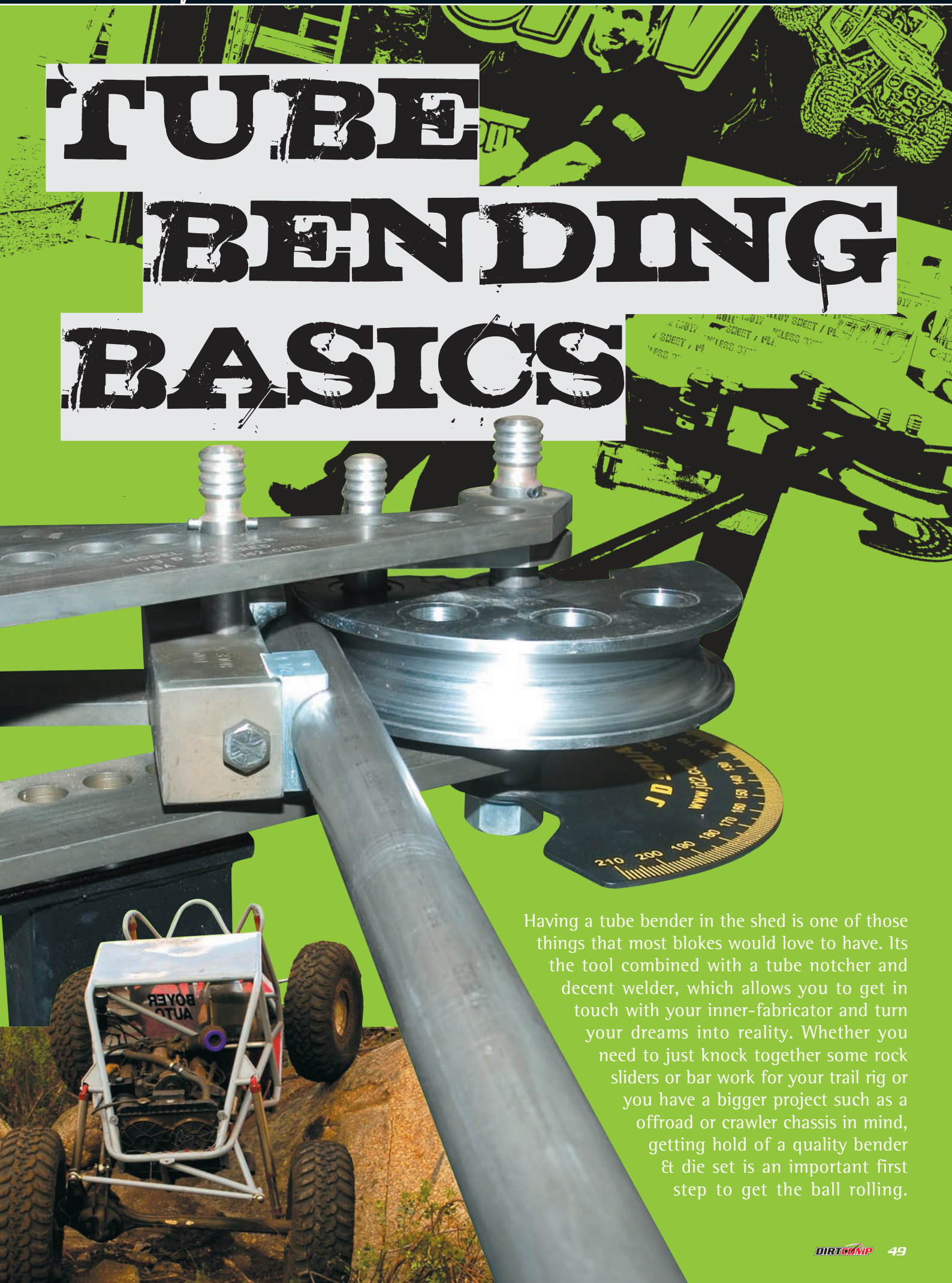
TUBE BENDING BASICS



Having a tube bender in the shed is one of those things that most blokes would love to have. Its the tool combined with a tube notcher and decent welder, which allows you to get in touch with your inner-fabricator and turn your dreams into reality. Whether you need to just knock together some rock sliders or bar work for your trail rig or you have a bigger project such as a offroad or crawler chassis in mind, getting hold of a quality bender & die set is an important first step to get the ball rolling.

Ideally you will be looking for a bender that won't kink or crumple your tube. As this will create a weak point which could allow the barwork to crumple more easily under impact. Choosing a rotary draw bender such as the Model 3 & 4 JD Squared, Speedwerx or Protools Benders with the correct dies for your tube will avoid this happening. They work by drawing the tube around a rotating bend former and the forming die rotates to the desired degree of bend.

A maximum bend angle of 180° (after springback) is achievable with these. Springback occurs when the pressure on the die is released. So to achieve a true 90° bend for example you may need to overbend the tube to 100° on the degree wheel, so it springs back to spot on 90°. The amount of springback will vary between different materials, so it always pays to do a few test pieces before starting work on the actual job.

As you will probably be using a couple of different sizes of tube in your project, you will require a specific die set for each one. So it pays to think through your design with this in mind. A die set refers to the components used in the bender to hold the tubing during the bending operation. It's made up of three components. A Forming die, which is the part the tube is actually bent around. A U-Clamp which locates the tube and a Pressure Die, which is the component which presses the tube into the forming die to make the bend.

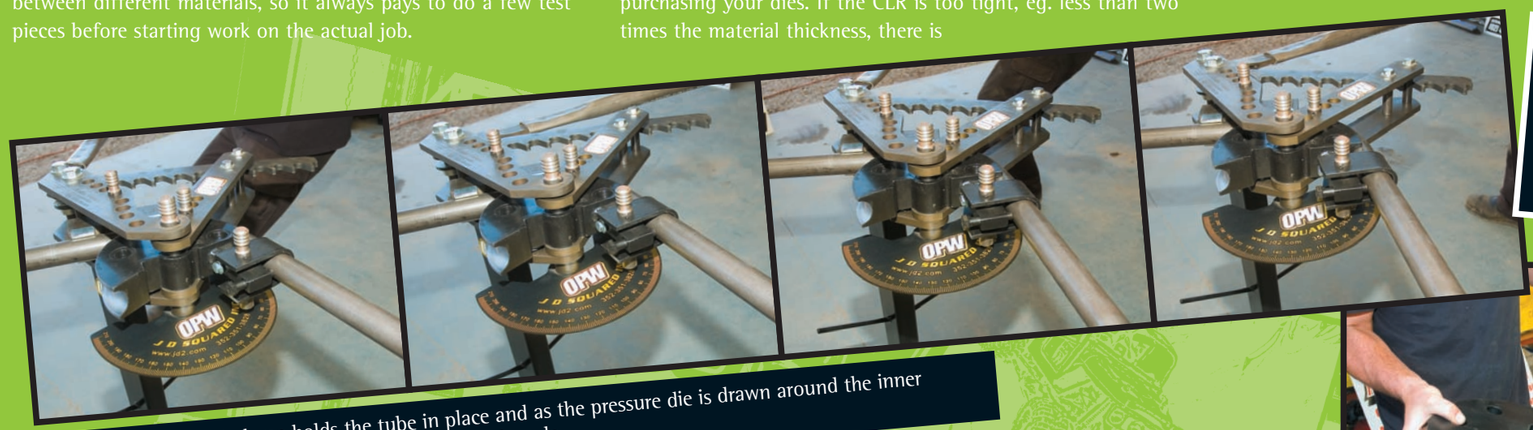
Stamped into the top of these will be the CLR (Centre Line Radius) which is the distance from the centre of the forming die to the centreline of the material to be bent. Different materials will require a different CLR, so keep this in mind also when purchasing your dies. If the CLR is too tight, eg. less than two times the material thickness, there is a good chance it may collapse during forming.

Another factor to keep in mind while designing your project is the minimum distance between bends. This is because rotary benders require a straight piece of tube for the forming tool to clamp on to during the bend cycle.

With these factors in mind, get out and have a go at it. Producing your own components can be extremely rewarding, especially if they perform well on the track. For more information on bending check out the tutorial on www.pirate4x4.com DIRTCOMP

BENDING TIP

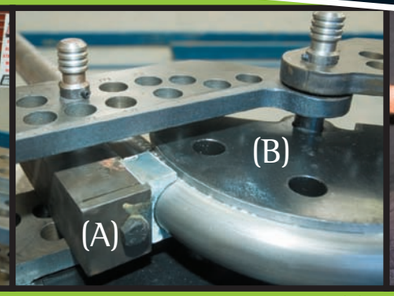
If you are doing multiple bends, use a carpenters level to ensure that your tube is sitting level before you start the second bend. This will keep the two bends on the same plane with no noticeable twist.



Above: The U-clamp holds the tube in place and as the pressure die is drawn around the inner forming die, bending the tube to the desired angle.

NOTE: Tubing is what is required for motorsport and is specified by its O.D. (Outside Diametre) and wall thickness, where pipe is specified by I.D. (Inside Diameter) and is most commonly used for transporting fluids.

Above: Make sure the pins are seated properly before bending



Above: The pressure die on the left (A) The forming die on the right (B)

Above: The hydraulics take a lot of the hard work out of it.

TIME TO GET HANDS ON:

The actual bending process is pretty straight forward. We would recommend doing some test pieces before you get stuck into your project to help you come to terms with the amount of springback you need to allow for with your particular material and also to help work out the actual starting point for the bend and the minimum distance between bends.

Below Peter Antunac from OPW runs us through the basic steps involved with using a JD Squared Model 3 bender. You will find the process similar for other brands. The same basic steps will also apply if you are lucky enough to have the budget to upgrade to hydraulic bender, except a flick of a switch will replace the muscle.

Step 1
Place the forming die into the bender and locate the pin.

Step 2
Slide your tube through and put the U-Strap on. This is matched to the O.D. of the tube you are bending. Tighten the pinch bolt to prevent the tube slipping, taking care not to dimple the tube. Note that the bend will start approx 7/8" back from the edge of the forming die.

Step 3
Place the Pressure Die into the bender. Lightly spray some lubricant on the tubing to assist it slip through the pressure die. Make sure all pins are completely seated in their holes to avoid damage to the bender or operator.

Step 4
Position the degree ring to 0°

Step 5
Select an appropriate drive finger then grab the swing lever handle and start to pull round.

Step 6
Keep ratcheting around until you reach the end of the drive finger or until the desired bend angle has been achieved. If you need to adjust the drive pin in the forming die, take care not to move the tube. Also remember to allow for springback.

Before you start, take the time to read the instructions throughly.

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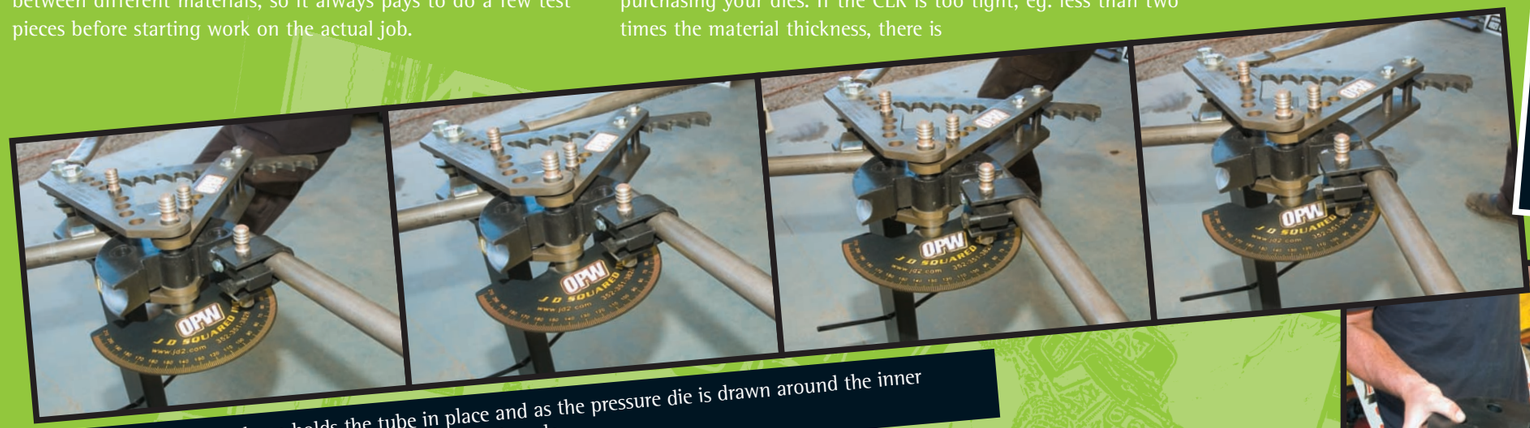

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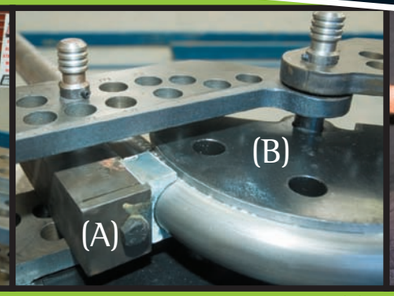

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