# RECOMMENDATIONS

## STRAIGHTENING METHODS

The most common passenger vehicle wheels are the MC Flange and the Euro Flange and straightening procedures are substantially the same for both styles.

Euro Flange


MC Flange

MC Flange styles are best for balancing because the weights are attached to the outermost portion of the wheel. The downside is that hammering weights in place damages the wheel finish in that spot and the weight also detracts from the beauty of the wheel.

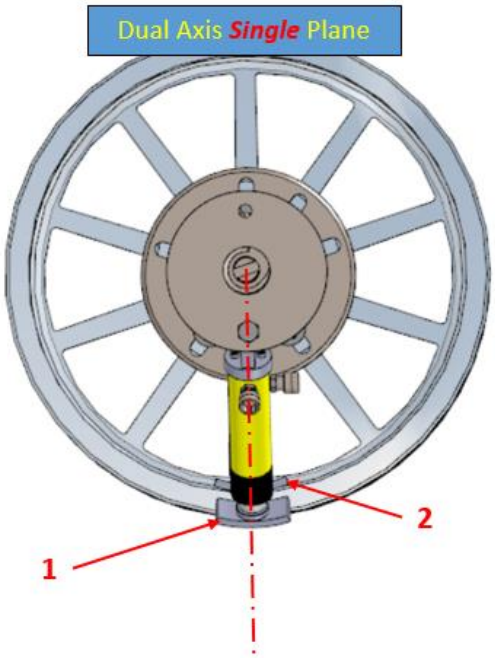
The Euro Flange style wheels are more beauty oriented and use adhesive weights for balancing. Because those type weights cannot be placed on the ***outermost*** point, as shown in the left photo below, the balance is not as precise.


Euro Flange

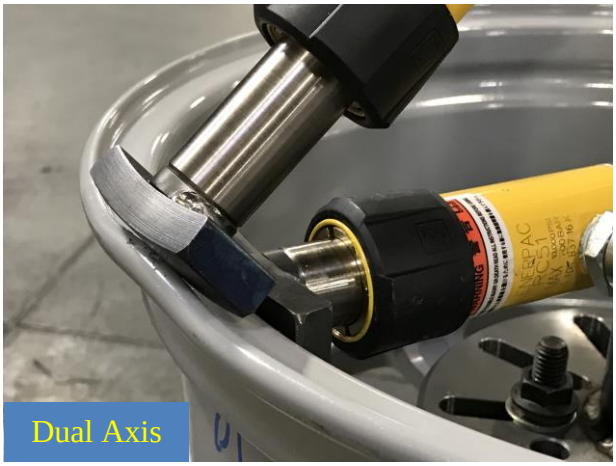

MC Flange

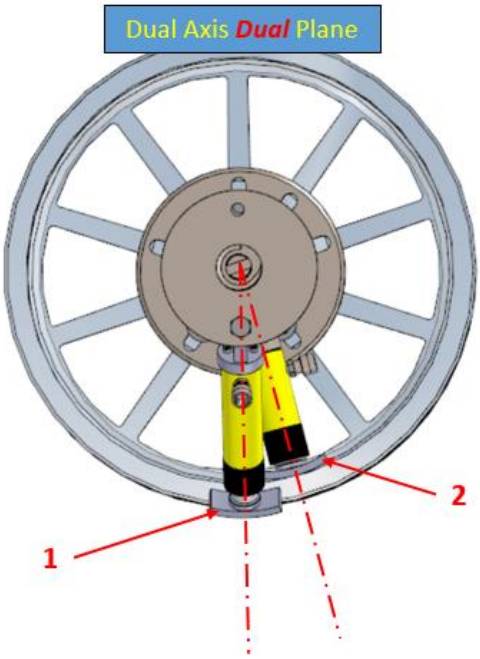
# STRAIGHTENING THE MC FLANGE WHEEL

If a wheel cracks during **any** straightening procedure, SAE requires that it be taken out of service. The application of heat will reduce the likelihood of cracking but too much heat will damage the wheel permanently. Safe heating limits are always used with the patented NewArc process.









Single axis pressure applications are effective but dual-axis and dual-plane methods are recommended because they gently spread the straightening forces over a wider area, resulting in the lowest possible crack rate. When pressures from Axis 1 and Axis 2 are alternated gradually and independently, the result is a gentle massaging action. Changing ram angles and planes during pressure applications also enhances the massage effect.

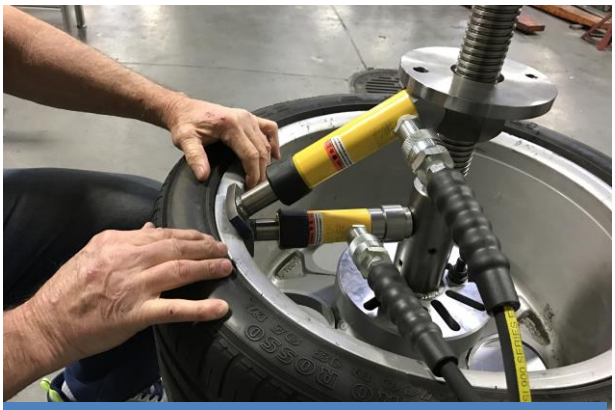
Recommended Straightening Methods

# STRAIGHTENING THE EURO FLANGE WHEEL

The same process described on the previous page is used for straightening but the Euro Flange style wheel requires more precise Ram positioning.

Single

Dual Axis



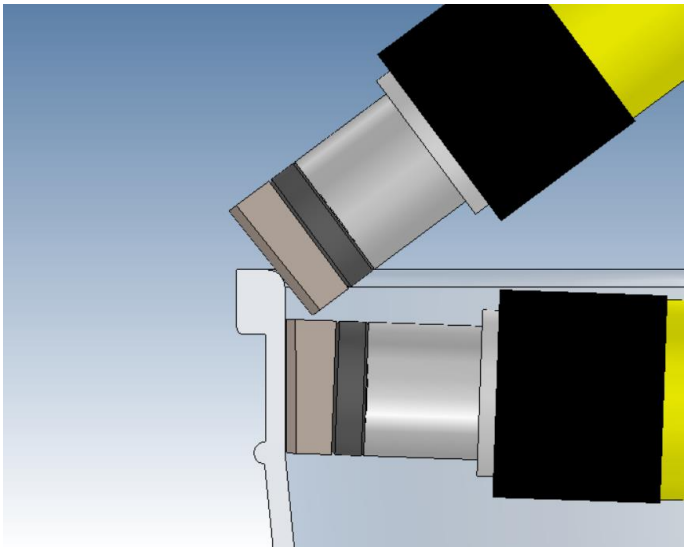
Alternating & Staggering Pressure

Single axis pressure applications are useful but dual-axis and dual-plane methods are always more effective. Care should be taken when positioning the upper ram on Euro Flange wheels. If too high, it could pop out of the setup. If the upper ram is centered properly, forces will be gently spread over each axis, resulting in the lowest possible crack rate.

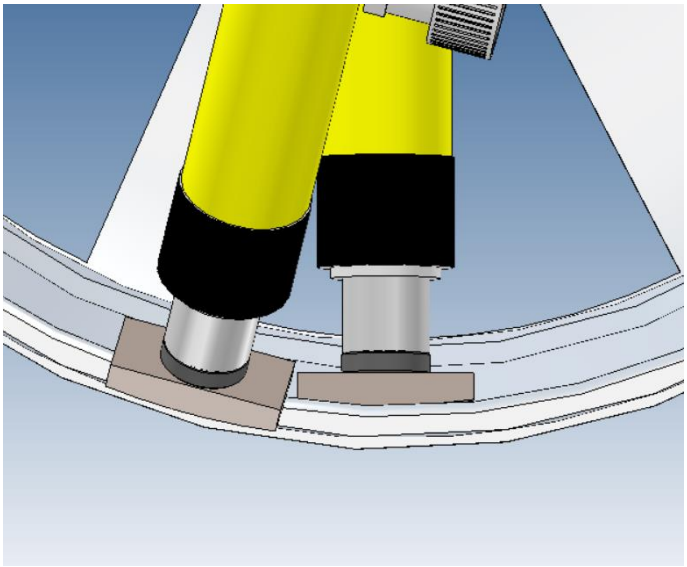
When pressures from each axis are alternated gradually, the result is a gentle massaging action. And changing ram angles and planes during pressure applications also enhances the massage effect.

***SEE NEXT PAGE***

# SETUP HINTS FOR EURO FLANGE WHEELS



Set the lower ram deeper in the wheel, leaving room for the upper ram to be set up at a steep angle. Make sure the straightening die of the upper ram is centered on the rounded surface of the Euro Flange. From there everything is the same and the pressure applications can be employed as usual.



Staggering the pressure is beneficial. While holding pressure on the lower axis, slowly release pressure from the upper axis until it can be moved or tapped into a different plane. But always make sure the face of the die remains centered on the flange. Alternating this action along with strategic impact yields the most success.

Strategic impact is particularly effective on Euro Flange wheels because the flange is wide, smooth, and easy to strike. Impact should be done in single axis mode with the lower ram is under pressure. Blows with a 6-pound lead hammer will shock the molecular structure of the pressurized metal.

Molecules have a memory, and they want to return to their original shape. The fresher the bend, the more likely this will take place. And firm dead blows will encourage this to happen. The combination of heat, alternating pressure and strategic impact is the key to success.

# SUPPORTING MAINSHAFT & MINIMIZING WHEEL FLEX

If you are struggling with a particularly difficult bend, a strategy change might be in order. When significant pressures are applied, the wheel will flex laterally, and the shaft will also flex backward. Minimizing these flexes, is the goal.

When using pressures over 5,000 psi, we recommend using the Pusher Support Attachment. It is setup to mirror the upper axis, as shown in photo below. It should be installed before any pressure is applied and it will accomplish two undesirable flexes. First, it supports the Mainshaft by preventing it from flexing back and second, it prevents the wheel from flexing laterally.

Use of this attachment represents a realistic strategy change on a problematic bend. Minimizing both shaft and wheel flex is not only a strategy change but it might allow you to use less pressure to accomplish your task.


# IMPACT

Impact is also an effective tactic in the straightening process. If done correctly, impact ***shocks*** the molecular structure of the metal and relieves the strain. This enables the molecules to return to their original position. Examples of safe and effective impact are depicted on the following pages.

# SAFE AND EFFECTIVE IMPACT

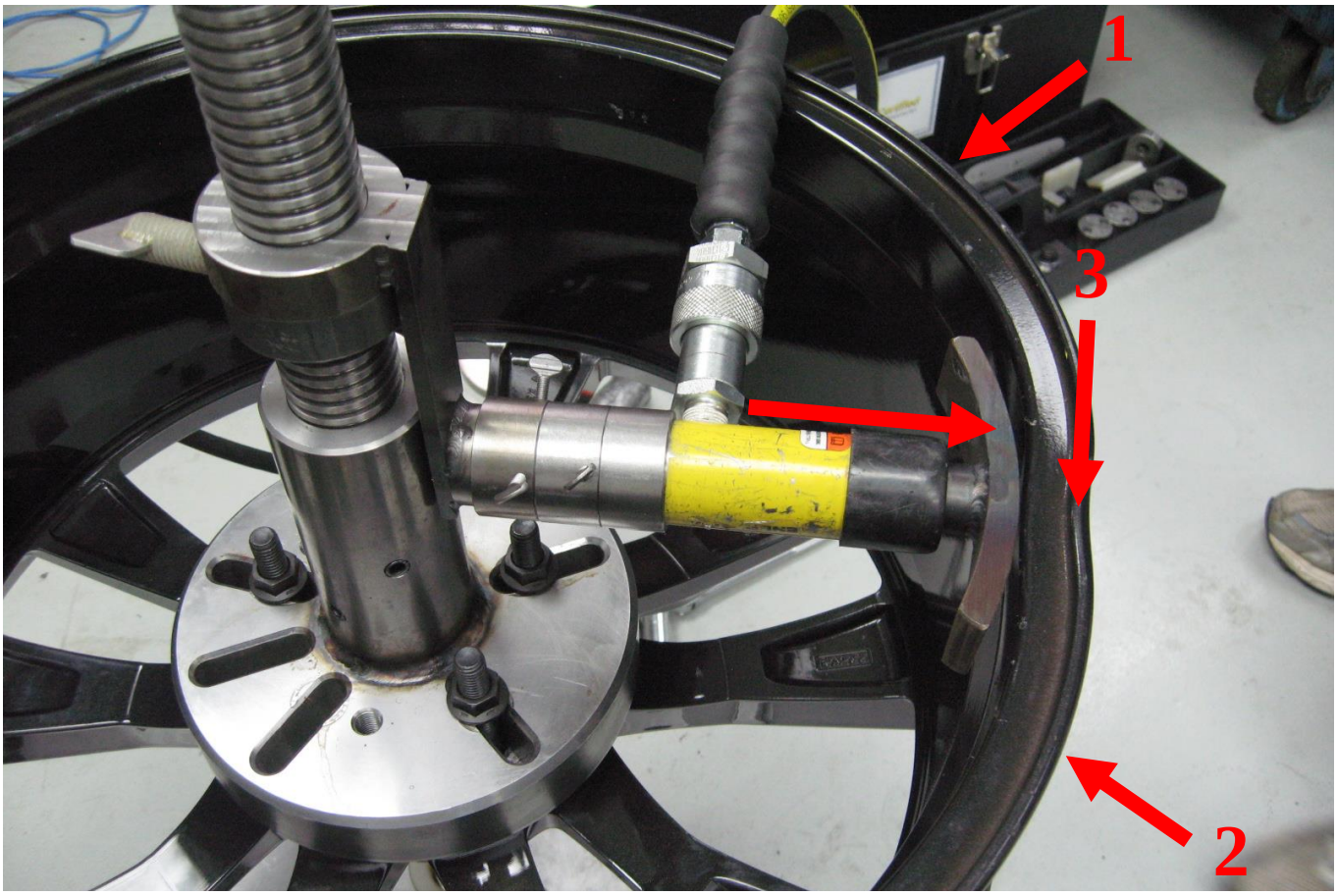
During some wheel straightening procedures, impact against the wheel surface is frequently necessary. Impact should always be done while the bend site is under some hydraulic pressure. Whenever impact is used, ***safety*** should always be of paramount consideration. When done on a wheel while significant hydraulic pressure is being applied, be aware that the setup could burst out of position. So be mindful of the fact that anytime a hydraulic ram is under high pressure, a potentially dangerous situation exists.

Impact should be considered as one of the most important steps in the straightening process. It works best when used ***before*** taking dial indicator readings. Tweaking with impact is also an excellent strategy when fine adjustments are needed. Sometimes just one sharp blow to the damaged area while pressure is being applied can make a significant difference or just a slight difference of only a few thousandths of an inch.

When you have the bend site under pressure, you can expect different results when you strike the damaged area. The most common type of impact is ***direct*** with an appropriate hammer, such as soft metal or composite dead blow.

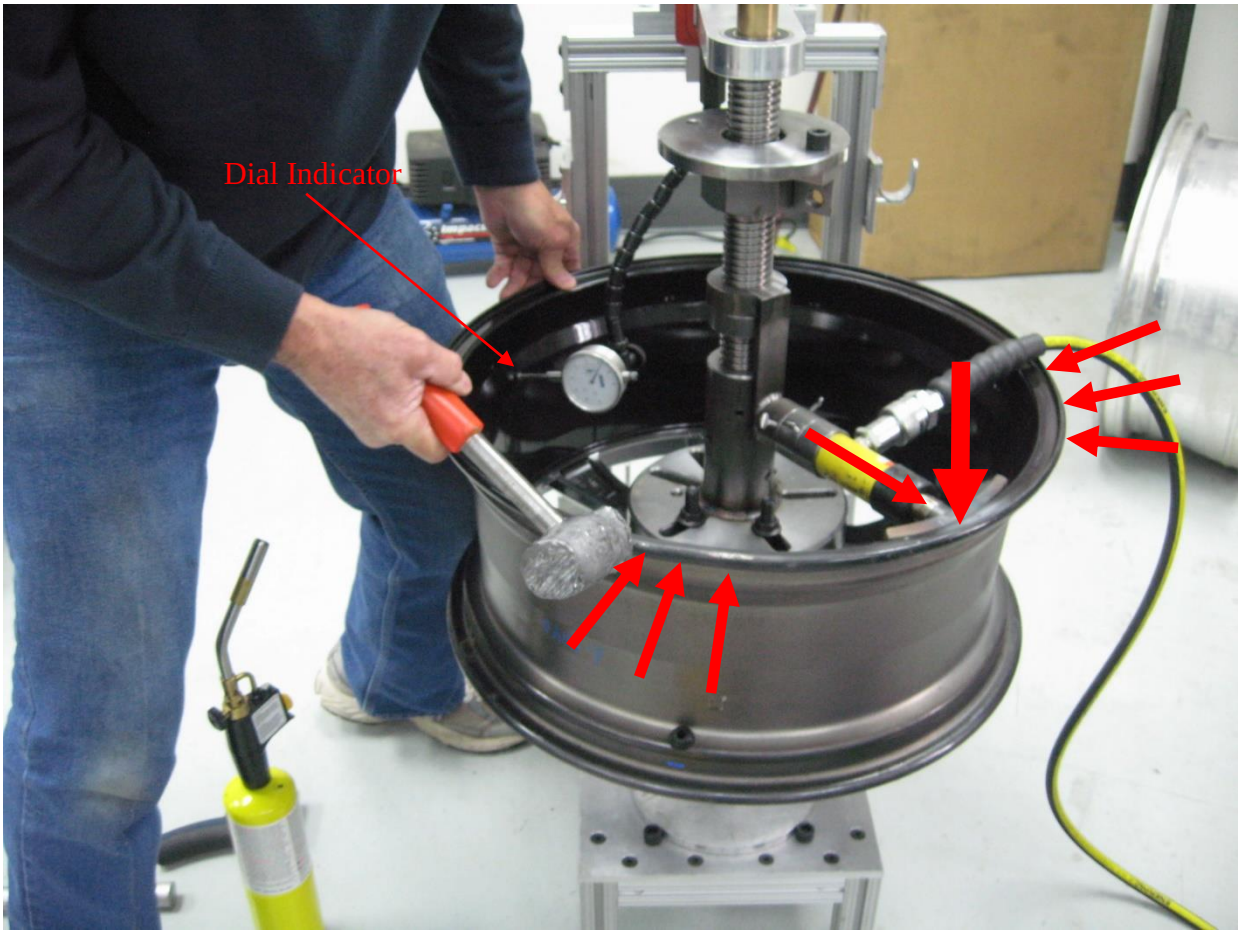
> *A heavy steel hammer can also be used if the bend site of the wheel is protected with pieces of soft but durable material. This will act as a shield against heavy tool marks.*

***Indirect*** blows can be transferred to the bend site accurately and safely with a drift punch made of soft metal, nylon or wood. The most ***controllable*** results can be expected without impact but with impact, different results can be expected, which are not as easily predicted.




There are three impact areas associated with virtually every inboard flange bend. One on each side of the bend and the third is directly downward over the bend site. The most effective impact is done with the lower axis ram under pressure at the bend site. When a wheel is bent, the areas on each side of the bend can be shocked with impact. This shocking expedites molecular movement in and around the bend area. While the hydraulic pressure force is pushing away from the mainshaft centerline, the impact on each side of the bend helps the metal in that area move inward and downward impact over the bend also helps the metal move back into its original position.

In many cases, impact is not necessary. However, when a bend begins to require an extreme amount of hydraulic pressure, impact is a good strategy. The amount of impact is determined as you go and it should be applied strategically. Light impact should be done at first at the strategic locations shown above. If more impact is needed, it is best to use a heavier hammer to strike to wheel rather than just hitting harder. Although the setup seen in the above photo is not yet ready for impact, the areas of impact adjacent to the bend site can be seen more clearly.




In the After the Dual-Axis hydraulic pressure process has moved the metal back into a shape that looks round to the naked eye, dial indicator readings will reveal the true runout. Once the runout shows the innermost spot on the wheel, the lower axis is placed against that mark and hydraulic pressure is added. Now the final adjustments can begin.

> *When using impact always be aware of damaging the dial indicator. Before starting even light impact, remember to move the tip of the indicator away from the surface of the wheel. If heavier impact is required, take the indicator off the machine entirely*

While the bent area is under pressure, light impact is done on the areas previously described. After each impact session, the lower axis is removed, and indicator readings are taken again. If there is no change, more hydraulic pressure is added, and the impact is heavier. Additional heat may also be a necessary part of this strategy. Repeat this process is until the wheel is within balanceable tolerances.

Sometimes the nature and severity of the bend might necessitate the use of ***heavier*** impact. Here a heavy steel sledge is being used with a piece of urethane to protect the wheel surface. Pieces of soft metal, nylon, wood, leather or even a section of tire side wall can be used to protect the wheel from heavy tool marks.

When heavy impact must be applied at a ***precise*** location, a ***Drift Punch*** is a useful tool.

Using a softer grade of aluminum or other forgiving material is best to keep toolmarks at a minimum.

**Regardless of the type of impact you use, remember that it should be done when the bend site is under pressure and always be mindful of safety.**