NEWARC™

DUAL AXIS STRAIN RELIEF

WHEEL STRAIGHTENING TECHNOLOGY

This third generation package is totally portable, easily stored and contains everything needed to perform wheel straightening repair services

The ***only*** tool capable of

Patented

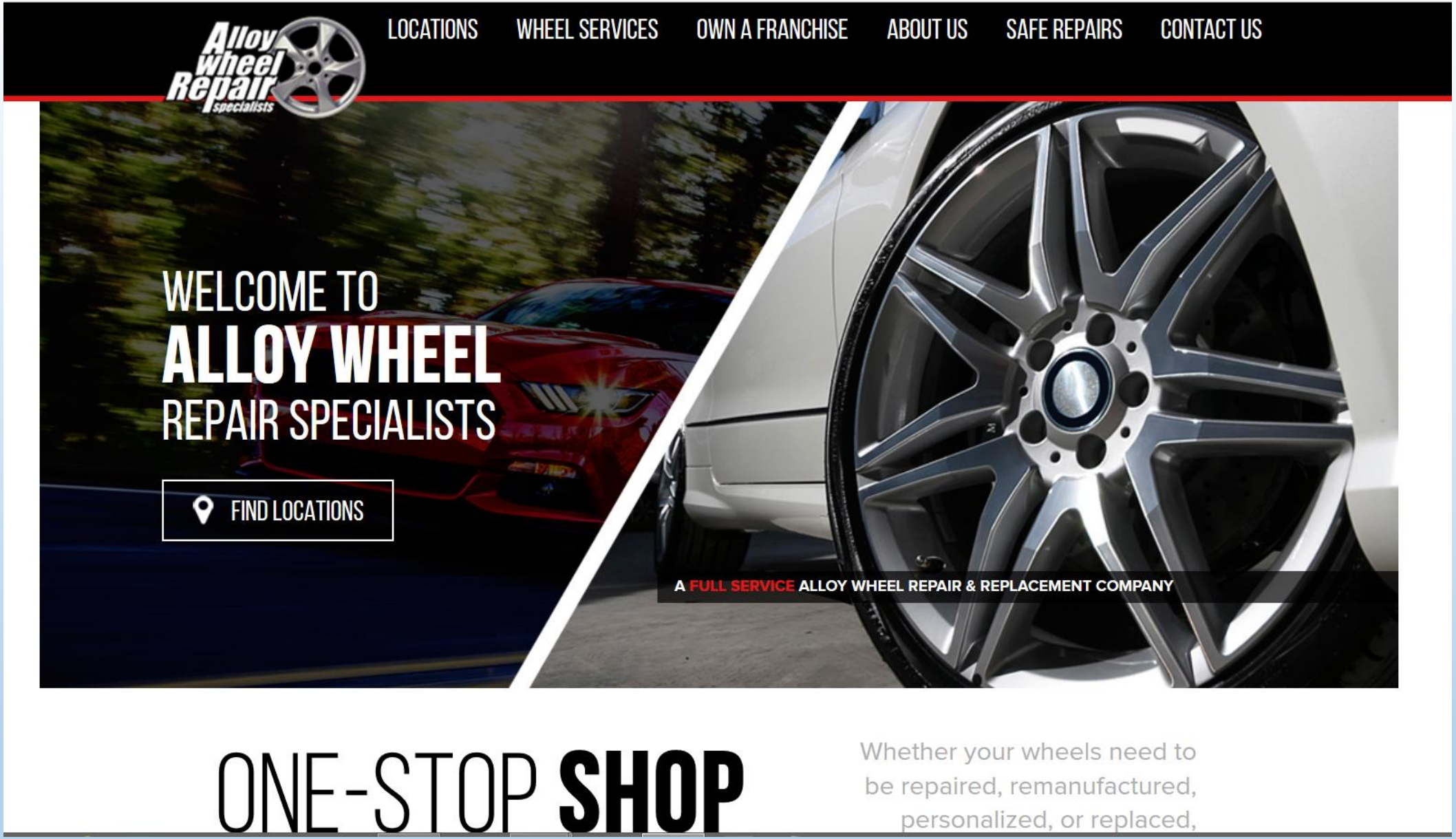
and

SAE Recognized*

Dual-Axis Strain-Relief Wheel Straightening Repairs

- **Portable**
- **Patented**
- **SAE Tested**
- **Incomparable**

* *For details see SAE Technical Paper 16SS-0173, which was published April 5, 2016 and presented at the 2016 SAE World Congress and Exhibition*



We were restricted under a 10-year contract to sell our machines exclusively to Alloy Wheel Repair Specialists, which is the largest mobile wheel repair company in the world. The contract recently expired, and we are now able to offer our machine for sale on the open market.

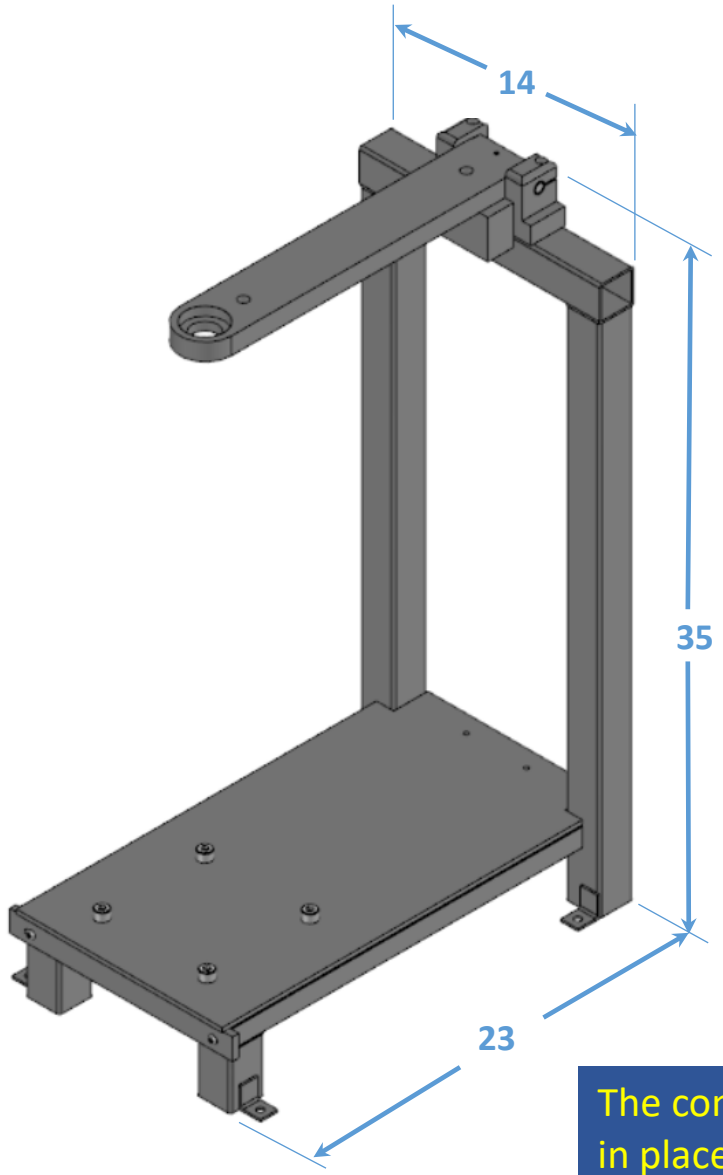
Time Tested Quality

Our machine has been around for over 15 years. The very first machine ever produced is still in service in Tucson Arizona and there are over 500 in use all over the world. Here a technician in Brazil is using soft impact with a dead blow hammer on the inboard flange of an alloy wheel. The most effective impact is always done with the hydraulic ram under pressure. Notice that he is comfortably seated on a stool or roller stool while working. Here the tire has been removed, which is always the best way to straighten a bent wheel. But sometimes it is not possible to remove the tire. If that is the case our machines have enough swing to get the job done with the tire still on.

Latest Catalog Advertisement for Mobile Services

The same kind of “touch” required for Paintless Dent Repairs is also evident in those who are skilled at wheel straightening. Our machine is featured in the Ultra Dent Tools product catalog, which is distributed to over 25,000 PDR business owners worldwide.

Portability and Storability



The compact size requires very little floor space for mobile applications. The frame can easily be bolted in place for stationary applications, if desired. The lightweight frame also makes the unit easily movable. The “Portability Package” enable an operator to easily move the unit to an out-of-the-way location until it is needed. No valuable floor space is consumed, and everything required for professional wheel straightening services is either attached to the machine or can be packed away in the toolbox.

PUMP & RAM BRACKETS

With the Portability Package, Rams and Pumps can be stored on the machine totally assembled. Even the Dies and Rockers can be left totally assembled and on the machine.

Simply route the hoses in a convenient out-of-the-way position and hang the Pumps & Rams in their Brackets in a “Ready Storage” configuration.

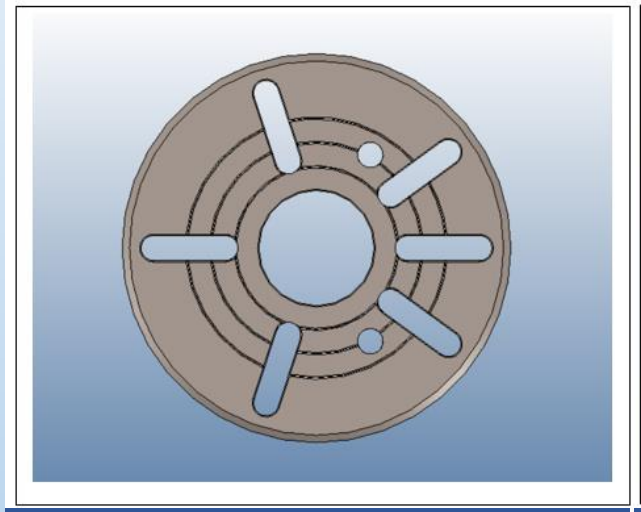
PORTABILITY PACKAGE

The machine can be equipped with the Portability Package, which includes Casters, Push Bar and Brackets from which to hang the Hydraulic Pumps and Rams. Since the machine requires no external power, the machine can even be moved and set up outdoors.

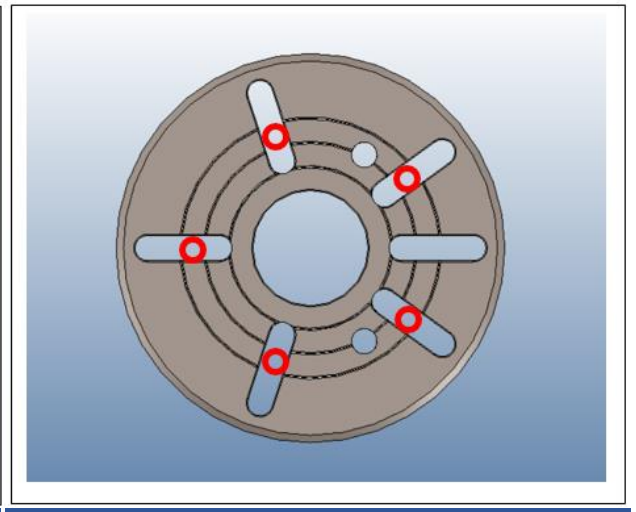
STATIONARY MOUNTING

If the machine is to be mounted in place in a POD or mobile unit, frame tabs can be used to secure the frame to the floor. Lightweight material is used on the latest steel frame and the Swingarm is now made of Aluminum.

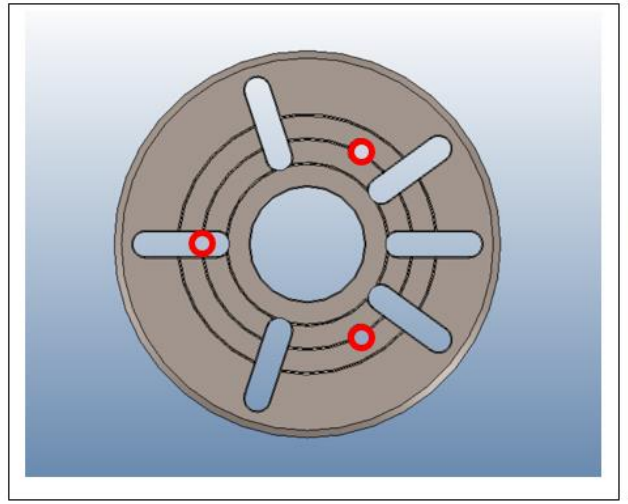
Machine Platen Design



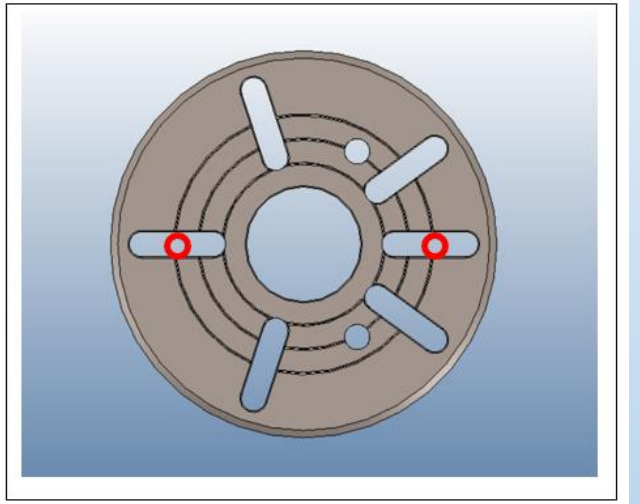
The current platen is designed to accept wheels with 3, 4, 5 or 6 lug bolt patterns.



The most common is the 5 lug bolt pattern.



The 3-lug pattern for Smart Car Wheels.



Only two mounting bolts can be used for the 4 and 6 Lug Bolt Patterns


US008695395B1

(12) **United States Patent**
Neubauer

(10) **Patent No.: US 8,695,395 B1**
(45) **Date of Patent: Apr. 15, 2014**

(54) **METHOD AND DEVICE FOR STRAIGHTENING WHEEL**

(76) Inventor: **Donald Neubauer**, Harrison Township, MI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 321 days.

(21) Appl. No.: **12/036,737**

(22) Filed: **Feb. 25, 2008**

Related U.S. Application Data

(63) Continuation-in-part of application No. 11/368,048, filed on Mar. 3, 2006, now Pat. No. 7,334,449.

(60) Provisional application No. 60/658,215, filed on Mar. 3, 2005.

(51) **Int. Cl.**
B21J 13/08 (2006.01)

(52) **U.S. Cl.**
USPC **72/457**; 72/705

(58) **Field of Classification Search**
USPC 72/705, 316, 457, 392, 393
See application file for complete search history.

(56) **References Cited**

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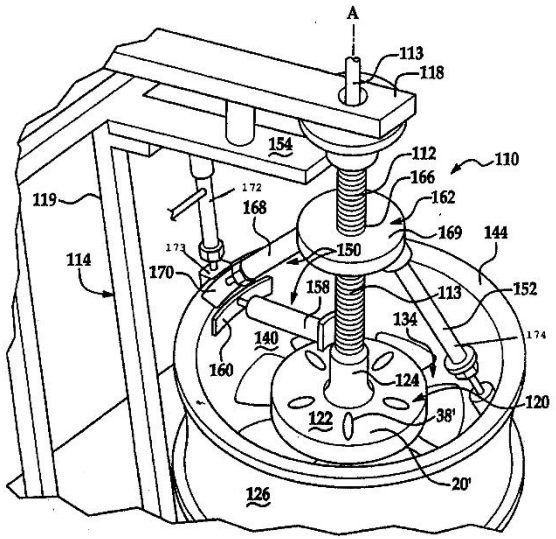
* cited by examiner

Primary Examiner — Debra Sullivan
(74) *Attorney, Agent, or Firm* — Young Basile Hanlon & MacFarlane P.C.

(57) **ABSTRACT**

A method and apparatus for straightening dents and irregularities in wheels including a spindle, a platen mounted on the spindle configured such that the wheel can be mounted on the spindle with the spindle projecting through the central hub hole and at least one actuator device positionable between the spindle and a section of the wheel to be straightened, the actuator exerting a straightening force on the rim of the wheel and a mobile device including the same.

18 Claims, 7 Drawing Sheets



The Patented NewArc™ machine can be used to ***Capture, Measure, and Straighten*** all in a single rigid and accurate setup. Here are the features of the NewArc™ machine:

The Patented NewBee™ machine can be used to ***Capture, Measure, and Straighten*** all in a single rigid and accurate setup. Here are the features of the NewBee™ machine:

MOUNTING

- Wheel is secured rigidly on the machine similar to the way it mounts on a car
- Tapered cones automatically locate the wheel around its true centerline
- Universal platen allows for mounting of all types of wheels
- Wheel can be inverted end to end without compromising accuracy of setup
- Relationship of wheel to mounting surface remains rigid in either position
- Accuracy of mounting remains constant in either position
- Wheel can be precisely measured in either position
- Wheel can be straightened in either position
- All straightening and measuring operations are done in single setup

MEASURING

- Because machine spins on precision bearings and the wheel is mounted around true center, the wheel turns accurately and spins in the same plane as it does when it is mounted on a car. As a result, precise measurements of critical surfaces can be made with a statically mounted dial indicator.
- Since the wheel can be inverted end to end without changing the setup, the accuracy of the runout measurements remains constant

STRAIGHTENING

- Straightening pressure is applied hydraulically
- Variable angles of adjustments are available for straightening positions.
- Straightening pressure originates from a rigid surface independent of wheel
- Straightening pressure is applied only to the damaged area of the wheel
- Supporting pressure can be applied either hydraulically or mechanically
- Straightening can be done on either the inboard or outboard side of the wheel
- Multi axis straightening and supporting pressure can be applied
- Straightening pressure applications can be independently staggered
- Heating and limited impact can be done while wheel is mounted on the machine

Independent Test Services
7704 Ronda Dr. • Canton, MI 48187-2003

R-6643
Grand Cherokee
AWRSM

Radial Fatigue Test Report

Test Parameters

Specification:	SAE J2530
Wheel Size:	16x7 in
Stud Size:	1/2 - 20 X 60
Tire Size:	P245/75 R16
Bolt Pattern:	5 x 5
Speed:	45 MPH
Load:	14,234 N

Test Data

Wheel ID:	Flange repaired
Mold ID:	
Date:	9/30/2009
Machine:	R-24

First Inspection Data

Cycles:	
Tire Pressure:	
Inspection:	

Second Inspect

Cycles:	
Tire Pressure:	
Inspection:	

Final Inspecti

Cycles:	1,850,
Tire Pressure:	63 PSI
Inspection:	No Cra

End of Test Description:

Acceptance criteria at Bogie cycles per specification

Does the wheel fail to sustain load/air?	No
Does torque loss exceed the specification?	No
Do cracks exist that exceed the specification?	No

Test Result: Pass

Technician: Tim Tracey

Independent Test Services
7704 Ronda Dr. • Canton, MI 48187-2003

C-3077
Grand Cherokee
AWRSM

Rotary Fatigue Test Report

Test Parameters

Specification:	SAE J2530
Wheel Size:	16x7 in
Stud Size:	1/2 - 20 X 60
Torque:	110 Nm
Bolt Pattern:	5 x 5 mm
Speed:	450 RPM
Load:	3,688 Nm

Test Data

Wheel ID:	Flange repaired
Mold ID:	
Date:	10/1/2009
Inital Deflection:	3.9 mm
Machine:	C-07

First Inspection Data

Cycles:	
Deflection:	
Nut Torque:	
Inspection:	

Second Inspection Data

Cycles:	
Deflection:	
Nut Torque:	
Inspection:	

Final Inspection Data

Cycles:	150,000
Deflection:	10.0 mm
Nut Torque:	122 102 115 113 120
Inspection:	No Cracks

End of Test Description:

Acceptance criteria at Bogie cycles per specification

Does deflection exceed the specification?	No
Does torque loss exceed the specification?	No
Do cracks exist that exceed the specification?	No

Test Result: Pass

Technician: Ken Archibald

Independent Test Services
7704 Ronda Dr. • Canton, MI 48187-2003

I-5910
Grand Cherokee
AWRSM

13° Impact Test Report

Test Parameters

Specification:	SAE J2530
Wheel Size:	16x7 in
Stud Size:	1/2 - 20 X 60
Tire Size:	P245/75 R16
Bolt Pattern:	5 x 5mm
Load:	615.0 kg
Tire Pressure:	29 PSI
Actual Striker Load	615.0 kg
Drop Height:	230.12 mm

Test Data

Wheel ID:	Flange repaired
Mold ID:	
Date:	10/9/2009
Machine:	I-01
Location of Impact:	VH
Air Pressure:	29 PSI (After Test)
Air Pressure:	29 psi (After 1 min.)

End of Test Description:

No Cracks

Acceptance criteria at Bogie cycles per specification

Does the wheel fail to sustain load/air?	No
Does torque loss exceed the specification?	No
Do cracks exist that exceed the specification?	No

Test Result: Pass

Technician: Ken Archibald

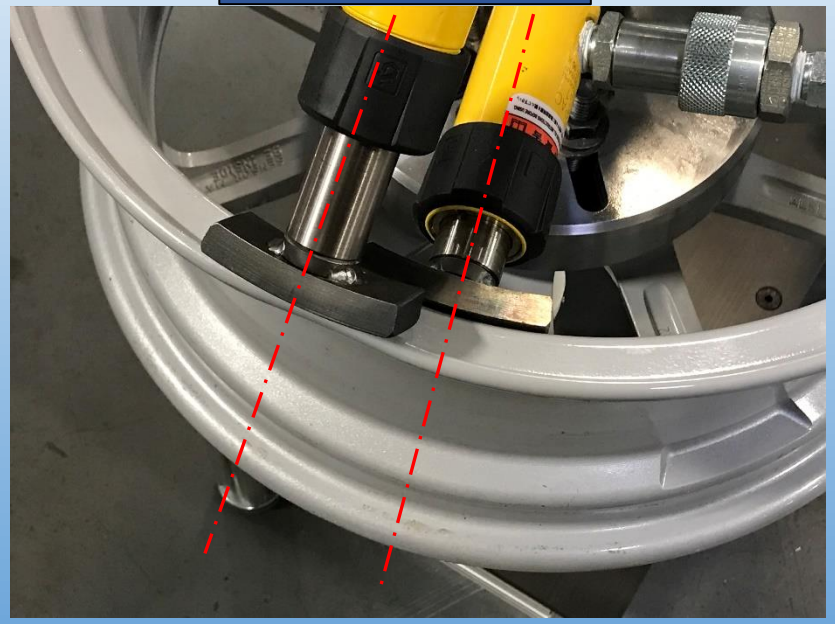
10/09/2009

In 2009 wheels straightened with our patented process passed every safety test required by the Society of Automotive Engineering for brand new wheels. Since that time, additional testing with our machine resulted in a ground breaking scientific discovery about bent and straightened wheels. This discovery resulted in a Technical Paper published by the Society of Automotive Engineers. To access the abstract page of this paper check on the Technical & Training pages under the heading **SAE Technical Paper.**

Patented Strain-Relief Straightening Method Explained

Dual Axis ***Single*** Plane

Dual Axis ***Dual*** Plane



Single Axis

Dual Axis

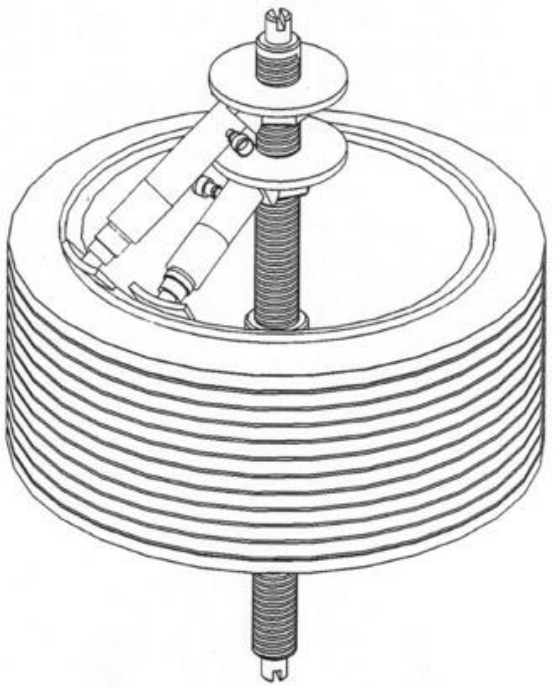
Alternating Pressure Applications

Multi-Axis and Multi-Plane capability produces the most effective straightening method. In each of these depictions, two rams are in press positions against the bend location. The rams in the left photo are both in the same plane. The right view shows rams staggered into two separate planes. The rams can also be positioned at varying angles of choice.

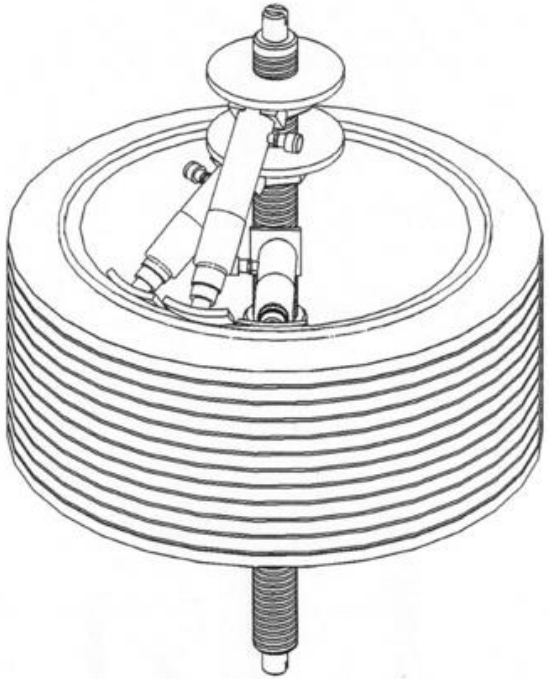
Pressure from each axis is applied gradually and ***independently***. Frequently moving the setup slightly produces the patented massaging action. This is less stressful on the metal and achieves maximum possible strain relief to the damaged area.

Since pressure originates from the rigid mainshaft, forces are concentrated on the damaged portion of the wheel ***only***. With each axis sharing the load, a greater amount of cumulative force can be applied. No other machine is capable of this patented process. Many more setup configurations are possible with the NewArc™ machine.

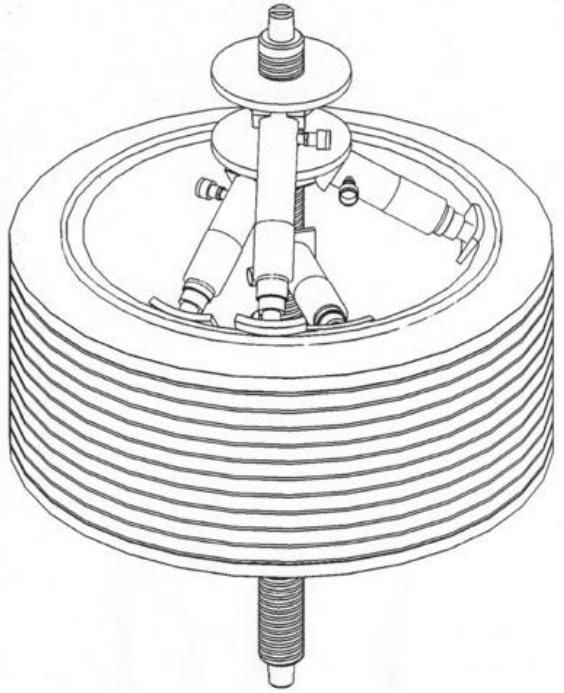
INCOMPARABLE VERSATILITY

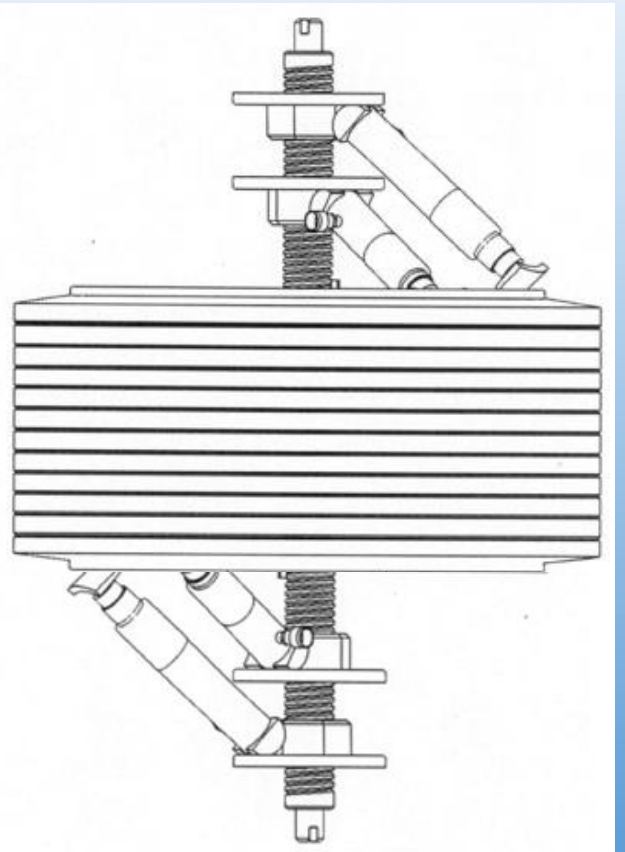


A two axis setup shown with both rams at different angles and staggered in different planes. This spreads the straightening forces over a larger area.



Here a third axis has been added, which is 90 degrees to the mainshaft. All axes are at different angles and in separate planes.





The last two depictions show four axis setups. Because the Pusher Platens are hexagon, even more rams could be added to these setups, which apply forces at different locations of the wheel. The setup on the far right can be used to correct lateral runout. Although all of these setups are certainly possible, they would be time consuming. But these drawings serve to illustrate straightening strategies of which no other machine is capable.

CRITICAL INSPECTION

Before even attempting a straightening, the wheel should be inspected . Critical areas should be checked for improper wear and cracks. Some flaws are evident, such as the wear on the lug holes in this wheel, but some flaws are not. If a flaw is suspected, a Dye Pen crack test should be performed. For additional information on inspection, open the pdf file on the Technical & Training pages under the heading **Crack Detection.**

WHEEL MOUNTING

There are two methods of bolting a wheel to the machine platen. You can use drop-in bolts, as shown in the left photo, or you can push bolts up from the bottom of the wheel, through the Mainshaft Platen slots, securing them with open end lug nuts. Regular hand tools are sufficient but air or electric impact tools can also be used to make mounting process faster.

WHEEL MOUNTING

It is always best to do a wheel straightening with the tire off. Mobil users of our machine are not always able to remove the tire so we designed the machine to have enough swing 30”, which easily allows room for tire. For more specific information about how to mount a wheel on the machine mainshaft, check the Technical & Training pages under the **Mounting Wheel** headings.

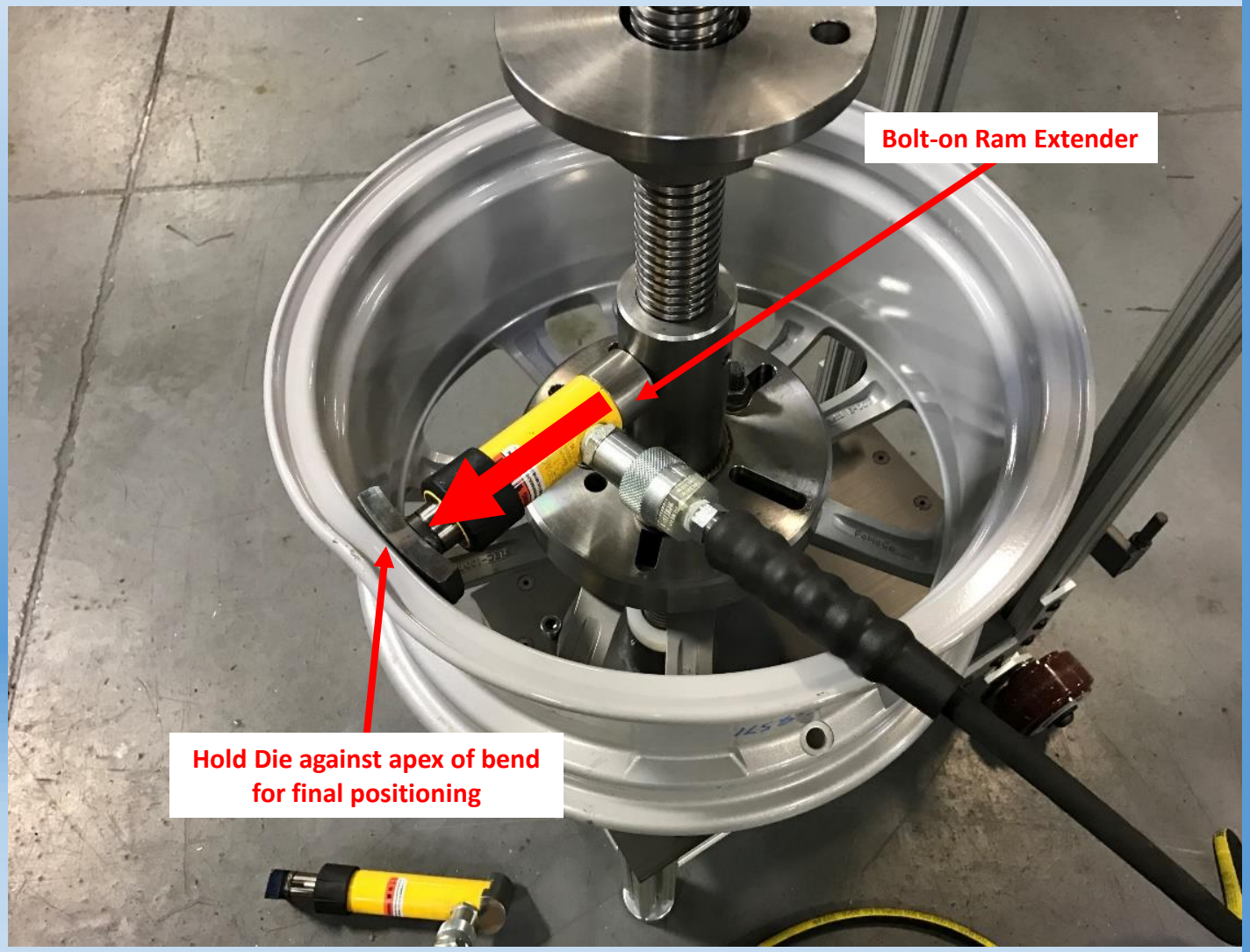
PROOF OF DUAL-AXIS SUPERIORITY

The following section of this training overview validate the superiority of the ***patented*** NewArc™ Dual-Axis method of wheel straightening. This typical repair sequence shows how the movement of the hydraulic gauges confirm how straightening forces are shared. Maximum localized force can be achieved without having to apply great a force to either axis. No other machine is capable of this and it proves the incomparable supremacy of our method.

When creating the Dual-Axis setup, it is important to position the Rams properly and secure them in the exact positions you desire. Once they are installed correctly, using them in the correct sequence will enable you to complete your straightening repair in a minimum amount of time with maximum efficiency.

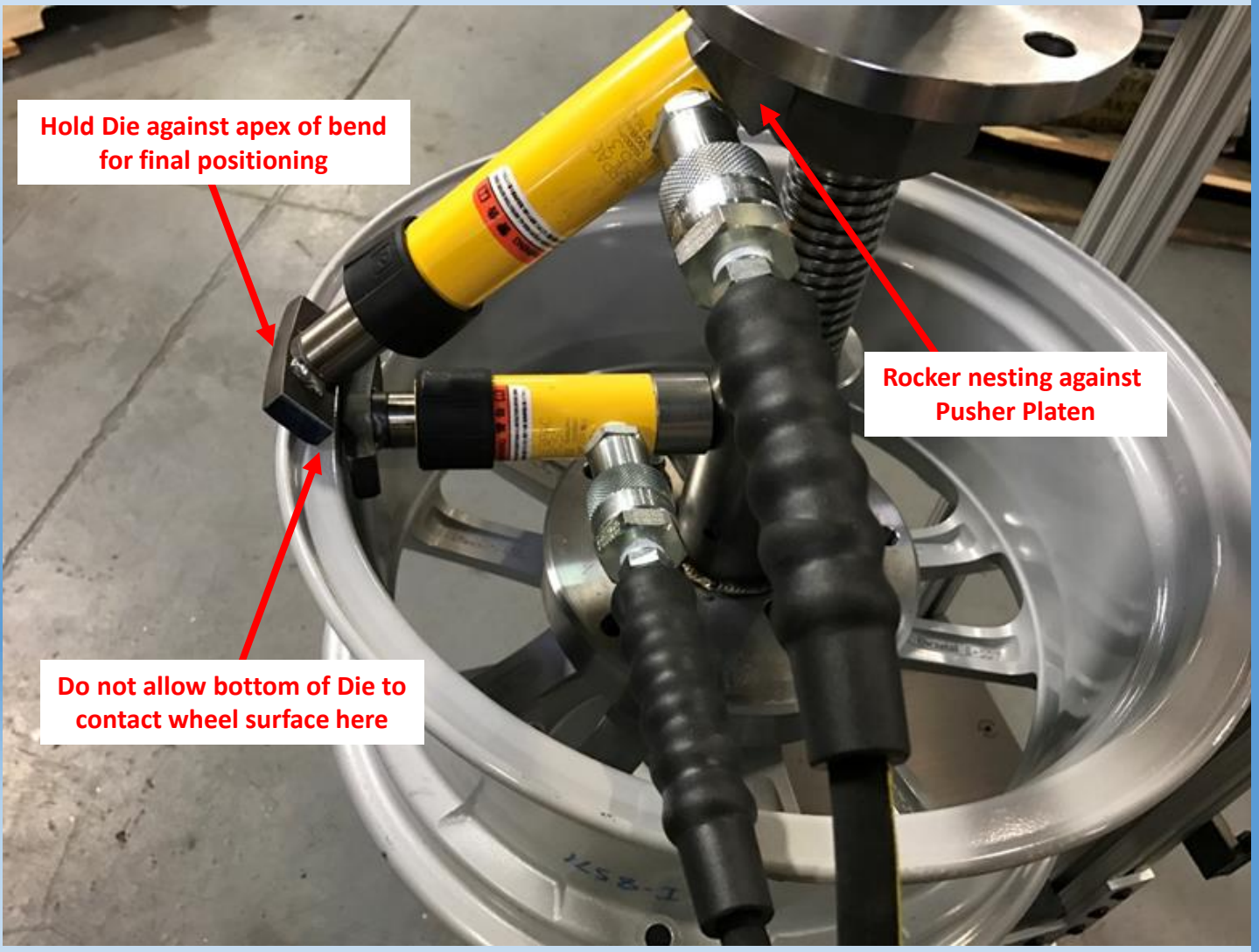
The next two pages illustrate the quickest way to set up a Dual-Axis straightening strategy. Proper positioning of the lower and upper axis Rams is explained as well as the correct sequence of pressure

LOWER RAM POSITIONING



1. The lower axis should always be installed first.
2. Before you position the Ram, make sure there will be *enough stroke* available to reposition the bend. If not, then install either a magnetic Ram Extender or a bolt-on extender, as shown here.
3. Next, retract the Ram enough that it can slide in and out of position easily.
4. Extend the Ram so it is close but not touching the bend.
5. Position the Ram so the Die is slightly below the edge of the wheel and pull it forward so it is contacting the wheel. This will leave a slight gap between the end of the Ram and the machine Mainshaft, enabling you to move it.
6. While holding the Ram against the wheel surface, guide the end of the Ram to the centermost point of the Mainshaft.
7. Use the pump to extend the Ram slowly until the end of the Ram contacts the spot on the Mainshaft that you have chosen.
8. Add just enough hydraulic pressure to keep the Ram in position but not locked in place. If you would like to make slight adjustments to the setup position, light taps with a small hammer will move either end of the setup until you are satisfied with the final position.
9. Once you have completed the positioning of the lower axis Ram, add more hydraulic pressure until about 500psi is shown on the gauge. This will lock it in place and the lower axis setup is now complete. With a little practice, the lower Ram can be set up in just a few seconds after heating.

UPPER RAM POSITIONING



The second axis is added to the setup and placed at a high angle, as shown here. In order to get maximum results, precise and careful positioning of the upper axis is most important. To start, the same steps are used as were done to setup the lower axis.

1. Hold the Die in against the wheel in the spot you want. Use the pump to extend the Ram slowly until the Rocker on end of the Ram nests against the Mainshaft Pusher Platen.

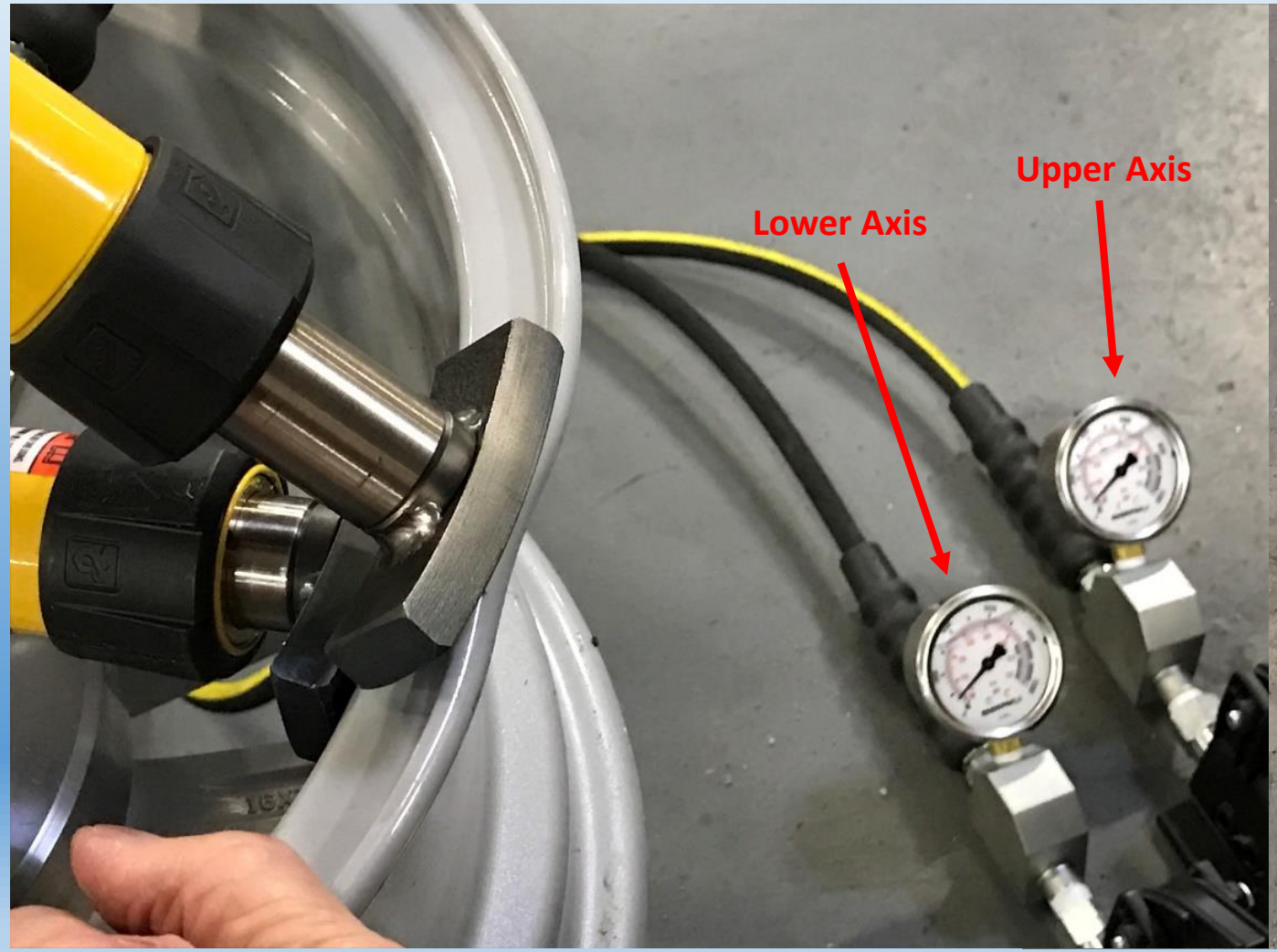
2. Add just enough hydraulic pressure to keep the Ram in position but not locked in place. This step must be done delicately while watching the gauge reading on the lower axis. Even slight pressure on the upper axis will reduce the lower axis pressure and too much could cause it could fall out of place.

3. If you would like to make slight adjustments to the setup position, light taps with a small hammer will move either end of the setup until you are satisfied with the position. If the wheel has a weight flange like the one shown here, make sure the bottom edge of the Die is not in contact the edge of the wheel surface.

4. If you are satisfied with the position of the lower axis Ram, you can begin adding more pressure on the upper axis to lock it in place. But this must be done slowly while making sure the lower axis pressure remains positive. If readable pressure can be seen on both gauges, both Rams will stay in their designated positions.

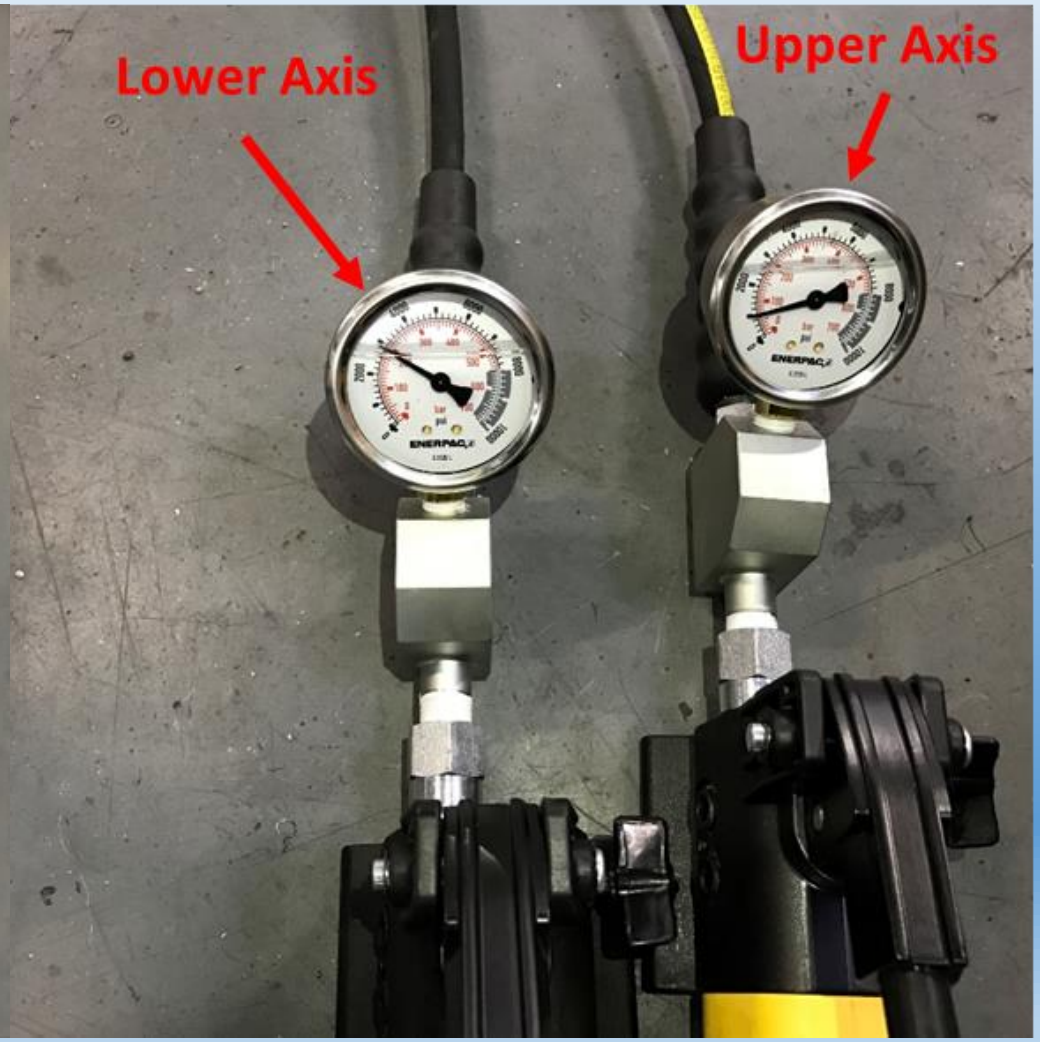
5. When pressures readings are low, adding more pressure must be alternated. Notice that, as you slowly add pressure on one axis, pressure on the other axis will slowly drop. When both gauges are reading about 500psi, the Dual-Axis setup is complete and the straightening process can begin.

PROOF OF DUAL-AXIS SUPERIORITY



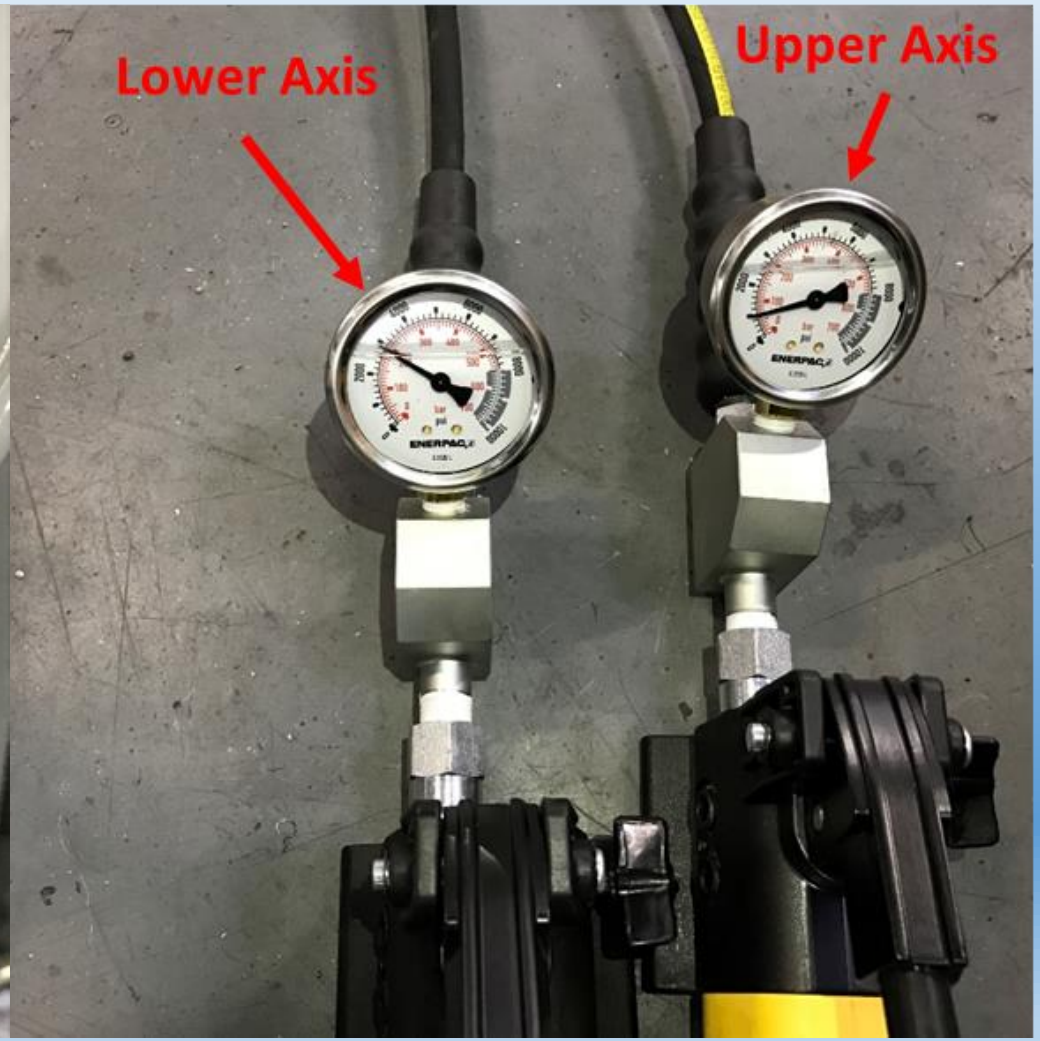
You must be aware that if even the slightest amount of pressure is added to one axis, pressure will drop on the other axis. So the initial pressure must be done carefully and alternated frequently. When both gauges read about 500psi., that will be enough to stabilize the setup configuration. At this point actual straightening pressures can be initiated. Increases are alternated, making sure that no pressure from either axis goes back to zero.

PROOF OF DUAL-AXIS SUPERIORITY



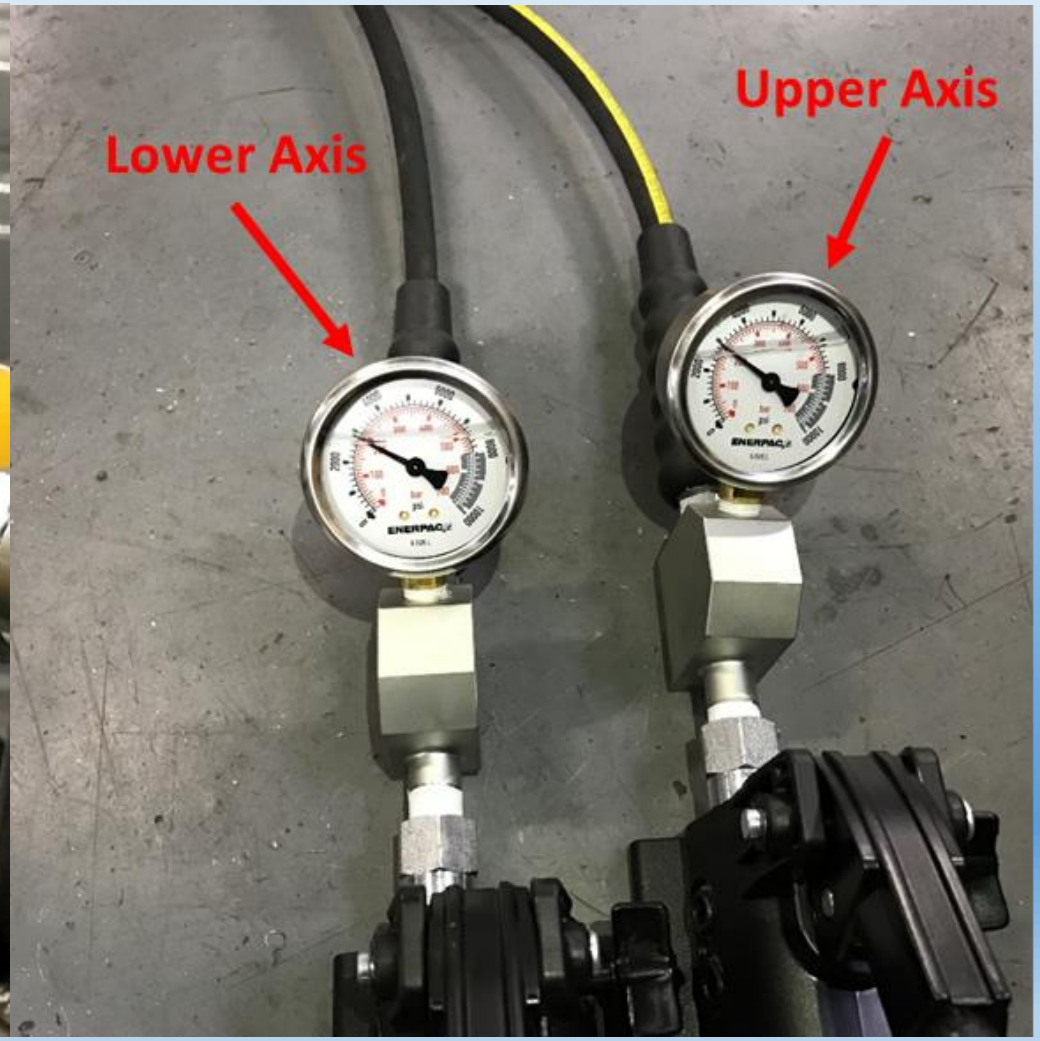
Once movement can be seen on both gauges, changes in pressure can be independently monitored and controlled. Here alternating pressure was added to each axis until both gauges read 2,000psi. Already the bend has moved out noticeably.

PROOF OF DUAL-AXIS SUPERIORITY



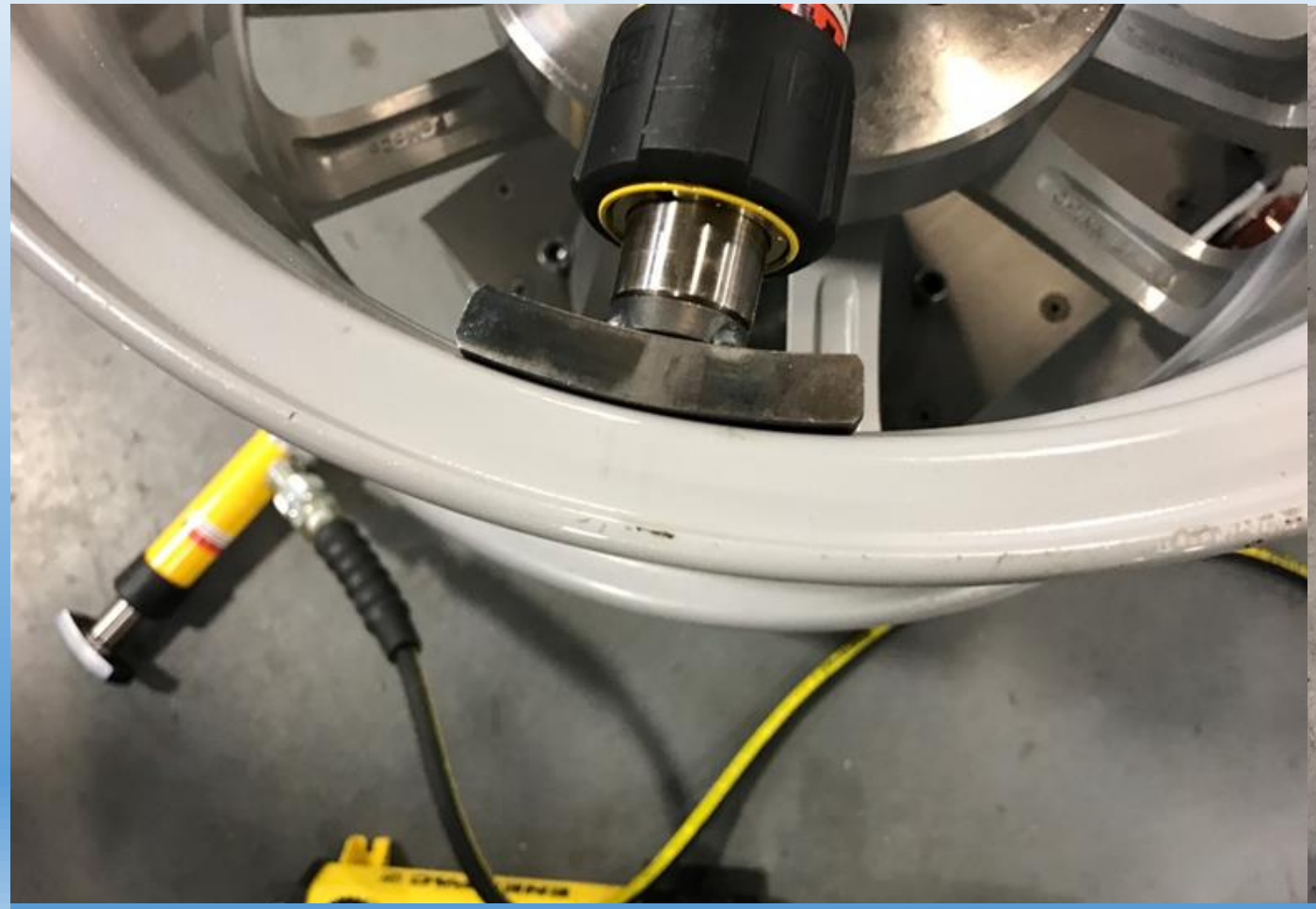
Always be mindful that whenever pressure is added to one axis, the pressure on the other axis drops significantly. Increases should always start from the lower axis. Here the lower axis pressure is raised to 3,000psi. That increase causes the upper axis pressure to drop back to 1,000psi. Alternating these forces produces a ***massaging*** action that is gentler on the metal. This exclusive process achieves maximum possible ***strain relief*** in the damaged area. At this point, the maximum ***applied*** pressure from either axis has not ***exceeded*** 3,000psi.

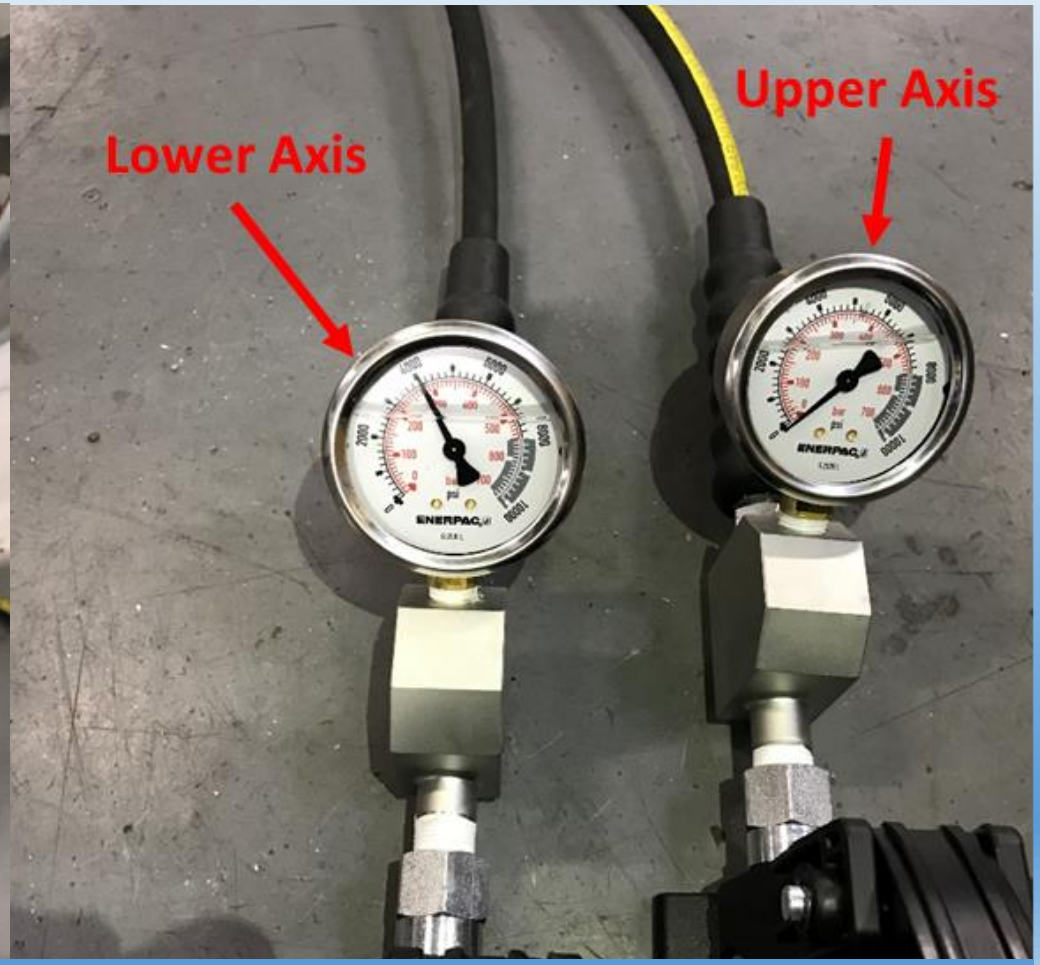
PROOF OF DUAL-AXIS SUPERIORITY



Pressure drops will keep happening on each axis every time pressure is brought higher on the alternate axis. Conversely, when pressure is reduced on one axis, it will go up on the other axis. Here alternating pressure is again applied to each axis until both gauges reached 3,000psi.

PROOF OF DUAL-AXIS SUPERIORITY





Here the upper axis was removed. At this point in the straightening strategy it may prove necessary for a repositioning of the upper axis. Or, if the wheel is starting to appear true enough, indicator readings can begin. From this point on, tweaking the bend site with only one of the axes may be all that is necessary to finish the job.

What is most significant to note here is that when the 3,000psi pressure on the upper axis was slowly released the pressure on the lower axis was subsequently raised to 4,000psi. The dual-axis method of load sharing enables the operator to reach 4,000psi of straightening pressure without having to apply that great a force from either axis. This is not possible with any other wheel straightening device.

PROPER HEATING

Although no heating is shown in the straightening demonstration photos that follow, it is important to mention that heating is the single most critical factor in wheel straightening. Improper heating can irreparably damage a wheel. It is important to monitor heat application, making sure that the wheel temperature does not exceed 400 degrees. No matter what type of torch is used, a wheel could be damaged. Time at temperature is the key. If a wheel is heated to over 400 degrees for a long time, the heat treat level could be damaged. The heating shown in the left photo is with a MAPP gas torch. The right photo shows heating with Oxy-Acetylene, which has rendered that wheel scrap.

When any metal is heated, it becomes more malleable. In order to take full advantage of the malleability of a heated wheel, you must move quickly when positioning the rams at the bend site. Quickness and efficiency skills will come with experience.

PROPER IMPACT

During typical 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. Anytime a hydraulic ram is under high pressure, a potentially dangerous situation exists. Impact should be considered as one of the final steps in the straightening process. It works best when used ***after*** taking dial indicator readings. Tweaking with impact is an excellent strategy when fine adjustments are needed.

Sometimes just one sharp blow to the damaged area while pressure is being applied can make the difference of a few thousandths of an inch. For additional information on the correct way to take advantage of impact, check the Technical & Training pages under the heading **Proper Use of Impact.**

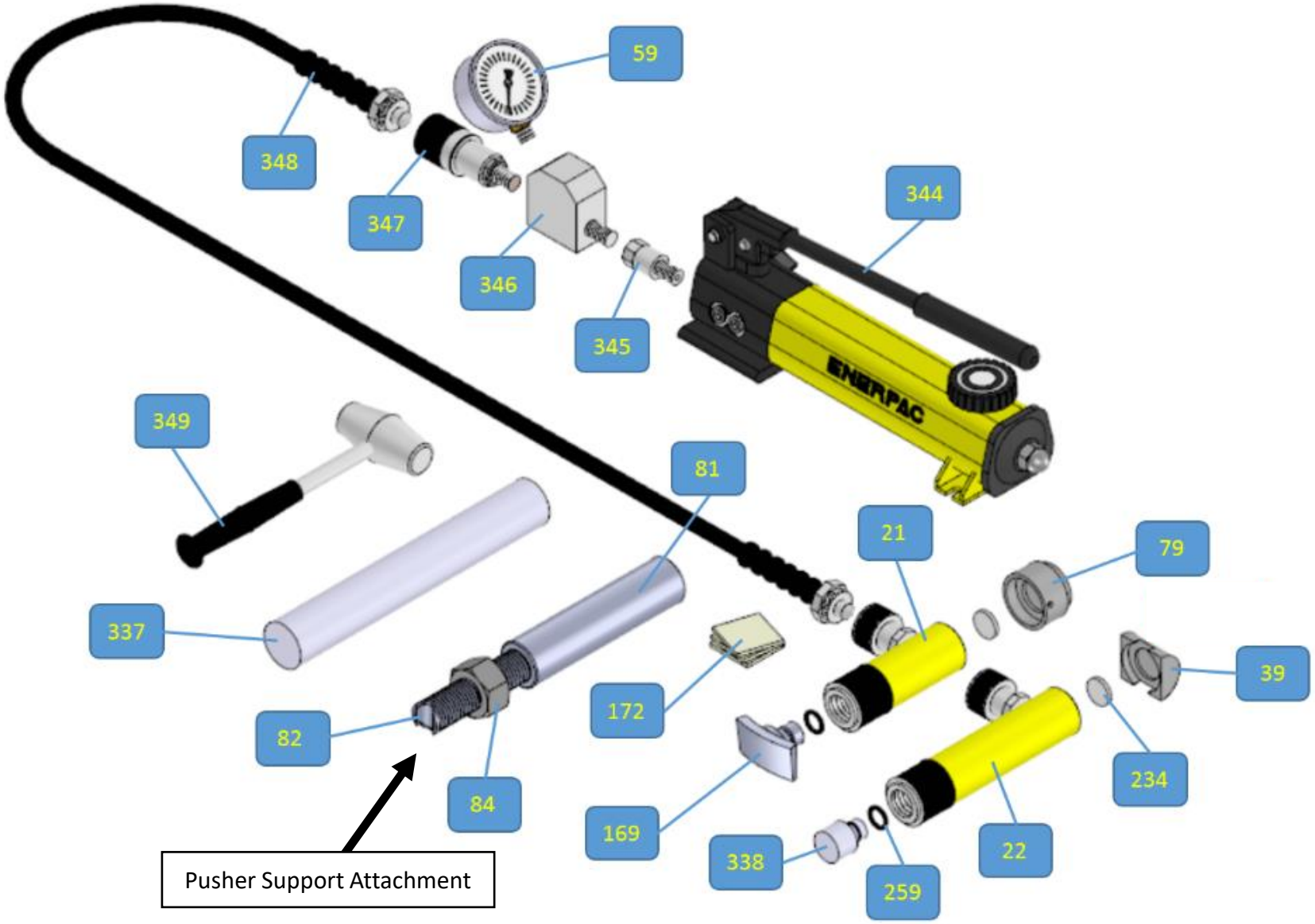
DIAL INDICATOR READINGS

One of the final steps in wheel straightening is taking dial indicator readings to determine acceptable tolerances. Current Alcoa standards are .030" TIR (Total Indicated Runout). Indicators are precision instruments and care must be taken to keep them from becoming damaged. Using heavy impact while the indicator is still on the machine can damage it or cause it to fall. For additional information on how to take indicator readings, check the Technical & Training pages under the heading **Reading a Dial Indicator.**

ATTACHMENTS

The following photos explain the accessories available with the NewArc™ wheel straightening machine. Some are standard equipment and some special attachments are optional.

PRESSURE & IMPACT COMPONENTS

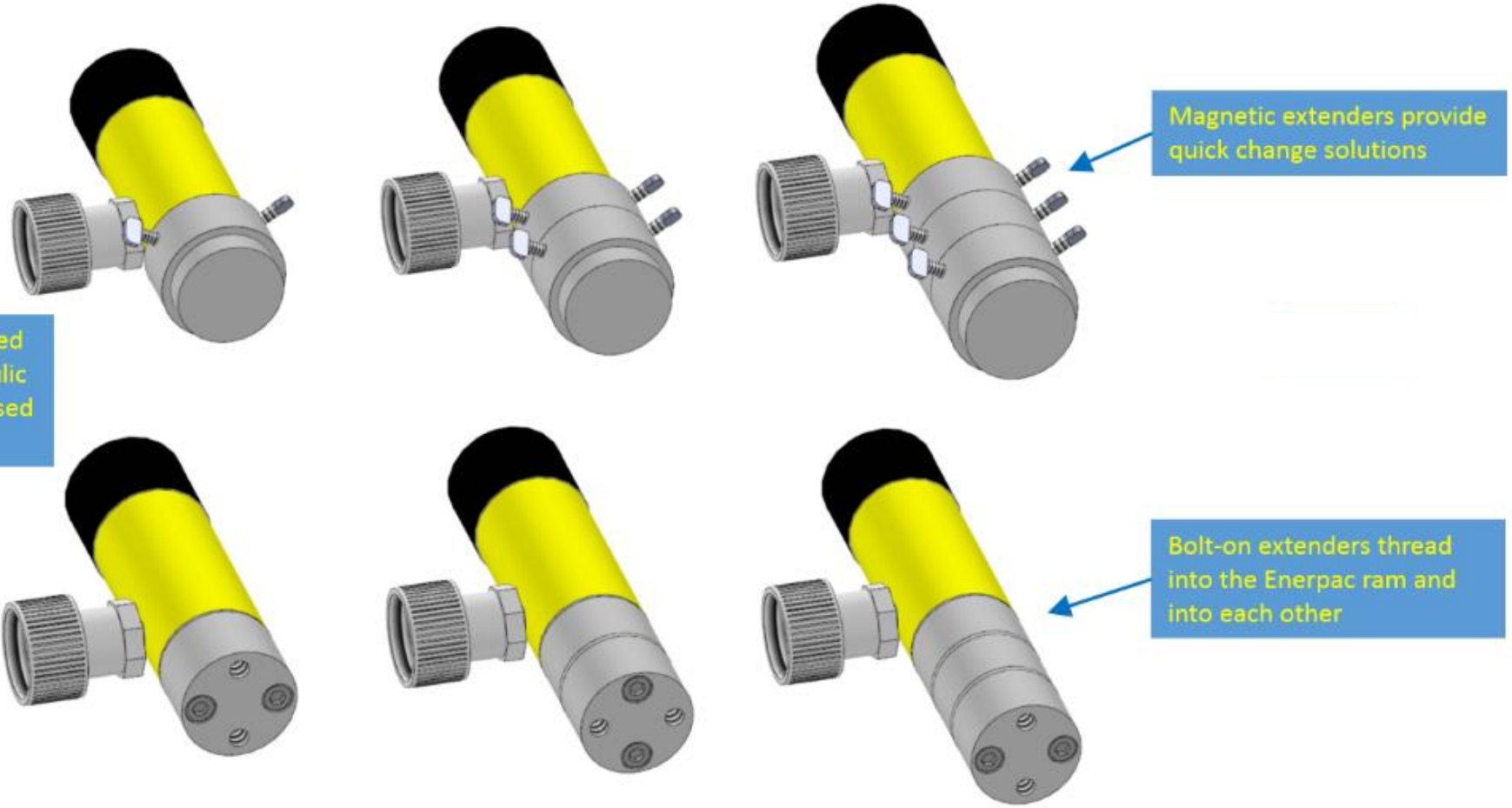


PART	REQ	DESCRIPTION
21	1	RC51 Hydraulic Ram
22	1	RC53 Hydraulic Ram
39	2	Magnetic Ram Rocker
59	2	G2535L Hydraulic Gauge
79	4	Magnetic Pusher Spacer
81	1	Pusher Support Tube
82	1	Pusher Support Threaded Rod
84	1	Pusher Support Adjuster Nut
169	2	Steel Die
172	3	Nylon Press Protectors
234	6	Disc Magnet
259	3	Die O Ring
337	1	Aluminum Drift Punch
338	1	Aluminum Button Die
344	2	P141 Hydraulic Pump
345	2	FZ1055 Adaptor
346	2	GA45GC Manifold
347	2	CR400 Coupler
348	2	HC9206C Hose Assembly
349	1	Cook Lead Hammer

When hydraulic pressure exceeds 5,000 psi, we recommend the use of the Pusher Support Attachment. It is set up to mirror the position of the upper axis. The nut only needs to be finger tight at setup. From there it will help support the mainshaft from straightening forces. Using this attachment will also prevent the wheel from moving laterally, during pressure applications.

When heavy impact needs to be applied in a precise location, the aluminum drift punch is a useful tool. It is a softer grade of aluminum than the alloy wheel, so tool marks will be minimal.

Stackable Pusher Spacers and Ram Extenders



Magnetic extenders provide quick change solutions

Stackable Ram Extenders are depicted on the ends of Enerpac RC51 hydraulic cylinders, which have a 4.34" collapsed length and a 1" stroke.

Bolt-on extenders thread into the Enerpac ram and into each other

Ram Extenders can be used with any Enerpac 5 Ton RC series hydraulic cylinder, they are most commonly used with the RC51 in wheel straightening setups. Each extender increases the collapsed length of the assembly by 1". The magnetic extenders can be changed quickly and can be used with or without the thumbscrews, which improve setup support slightly. The bolt-on style extenders provide a more permanent and stable assembly.

Stackable Ram Extenders and Rockers



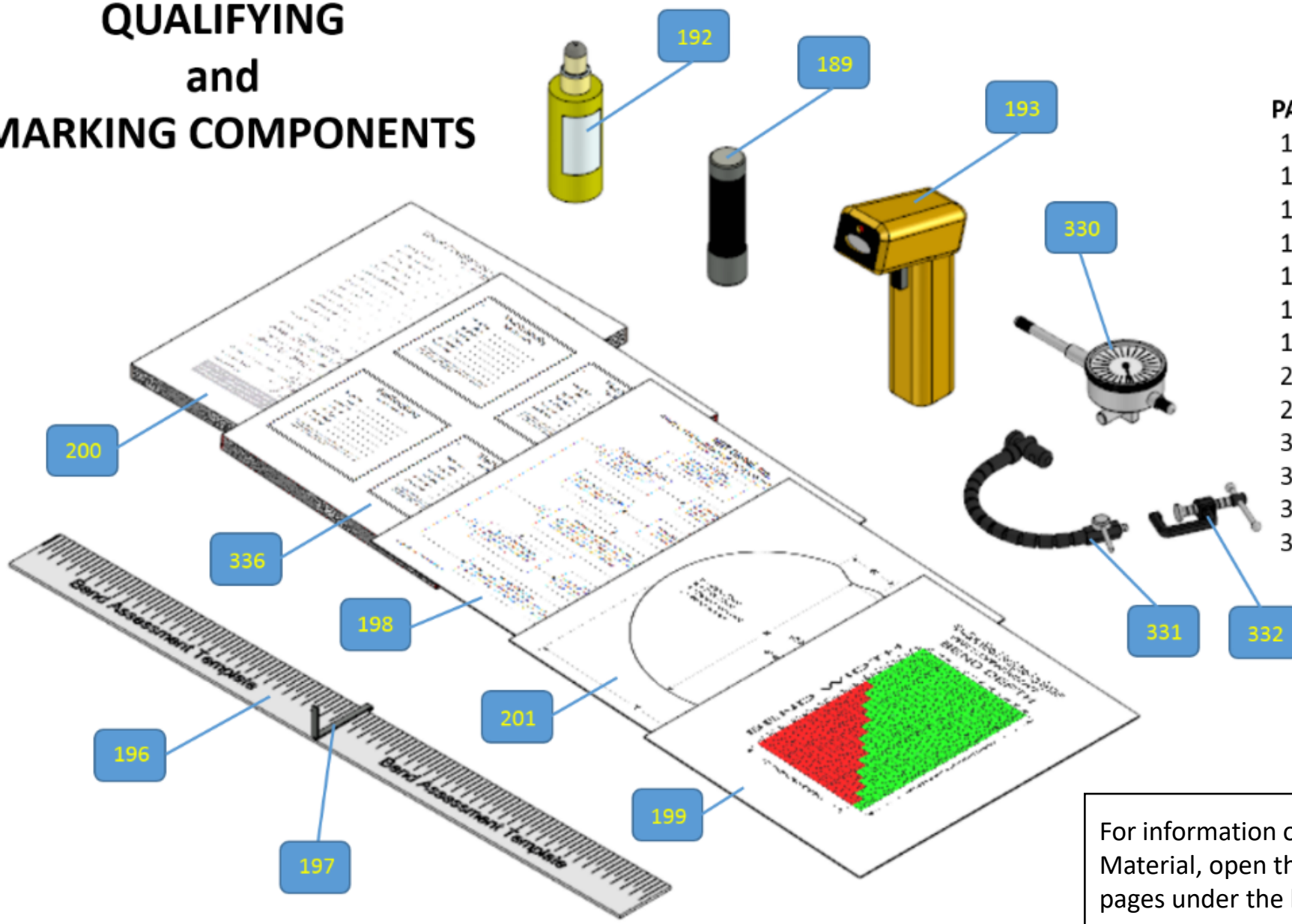
The Magnetic Extenders or "Pusher Spacers" have a counterbored cavity which contains a disc magnet with 5 pounds holding power. They snap in place over the end of the hydraulic cylinders. They can be used with or without thumbscrews, which improve stability by preventing "sag" when pressure is released in the setup. They can be stacked quickly and each increases the collapsed length of the assembly by 1". The Ram Rockers are shown in the right two photos.


A Magnetic Ram Rocker is shown next to a Pusher Spacer above and a close up view shows how the Rocker is positioned against the Hexagon Pusher Platen. The Rocker enables the hydraulic ram to be set up at various angles, depending on the position of the hexagon platen.

The Bolt-On Extenders fasten right to the end of the hydraulic cylinders. Although the Magnetic Ram Extenders are quicker, the Bolt-On Extenders offer a more permanent solution to increasing the length of the span. This setup choice is also more secure and there is no chance for "sag" in the assembly. Each Extender is counterbored to eliminate interference from the assembly bolts. As they are stacked, the are rotated 90 degrees. These Extenders are the best choice on large wheels where a long span is required.

Here an assortment of Extenders are being used in the span of a 22" Jaguar wheel. Each axis can be used independently or in tandem as shown here.

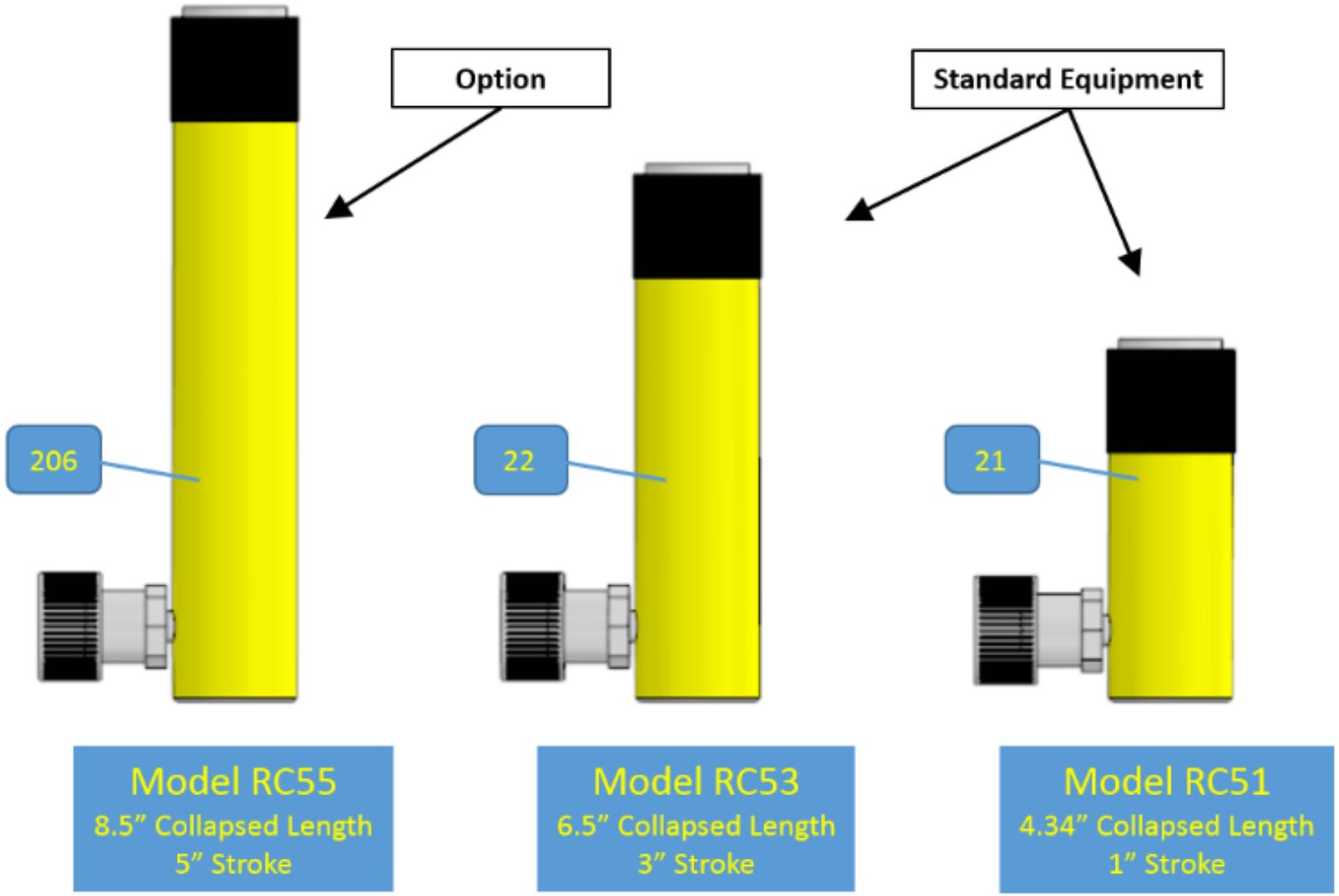
QUALIFYING and MARKING COMPONENTS



PART	REQ	DESCRIPTION
189	1	UV Inspection Light
192	1	Fluorescent Dye Penetrant
193	1	Infrared Thermometer
196	1	Bend Assessment Template
197	1	Template Scale Clip
198	1	Decision Flow Chart
199	1	Bend Ratio Chart
200	50	Quality Assurance Reports
201	1	Do Not Straighten Formula
330	1	Dial Indicator
331	1	Indicator Flexbar
332	1	Indicator Flexbar C Clamp
336	50	Temporary Repair Labels

For information on how to use and validate the Reference Material, open the pdf file on the Technical & Training pages under the heading **Evaluating Bends.**

ENERPAC 5 TON RC SERIES RAM COMPARISONS



All NewArc™ parts and accessories are interchangeable with any 5 Ton Enerpac RC Series Hydraulic Cylinders

For those who also use the NewArc machine for cosmetic repairs, we offer a Manual Bead Breaker attachment to make sanding and painting repairs on the outboard bead easier and more effective.

50 Page User Manual

The Technical & Training pages of the NewArc™ website contain all the additional information you will need to become a wheel straightening professional. In addition, there is a downloadable 50 page user manual that covers some of the information in more detail.

Because this manual is presented in PDF format, you can use the “Find” feature to search for specific information, using key words or phrases.

To open the file on the Technical & Training pages of this website, click on the heading **Straightening Manual for Review and Downloading.**

There are certain items we do not include with our machines, including the following:

Roller Seat

Some techs prefer kneeling while working but sitting is much more comfortable.

Standard Hand and/or Power Tools to Mount Wheels

Such as Ratchet, extensions, sockets, or impact wrenches.

MAPP Gas Torch

Propane or Oxy-Actylene can also be used, if properly done.

Assortment of Hammers

Such as heavier Lead, Babbit, Copper, Brass, Composite or Steel sledges.

Assortment of Resourceful Items

Such as pieces of wood, metal or nylon to use as drift punches or spacers. Also leather or nylon for use as protective barriers for wheel surfaces.

Problems will arise occasionally when straightening a wheel.
These can be time consuming but are easy to solve. As you become more experienced, such difficulties will become less frequent.

It is impossible to prepare you for every problem but there are three common issues to watch out for and they are as follows:

False Feedback

Either the wheel is ready to crack under pressure, or the Ram has reached the end of its stroke.

Ram Will Not Retract

Loose connection at the hose and Ram coupler is common cause.

Chasing a Bend and Irreparable Runout

Understand why and know when it is time to quit trying to get a better result.

Photos and detailed explanations, which provide easy solutions to these problems can be found on the Technical & Training pages. Open the pdf file under the Heading **Problem Resolutions.**