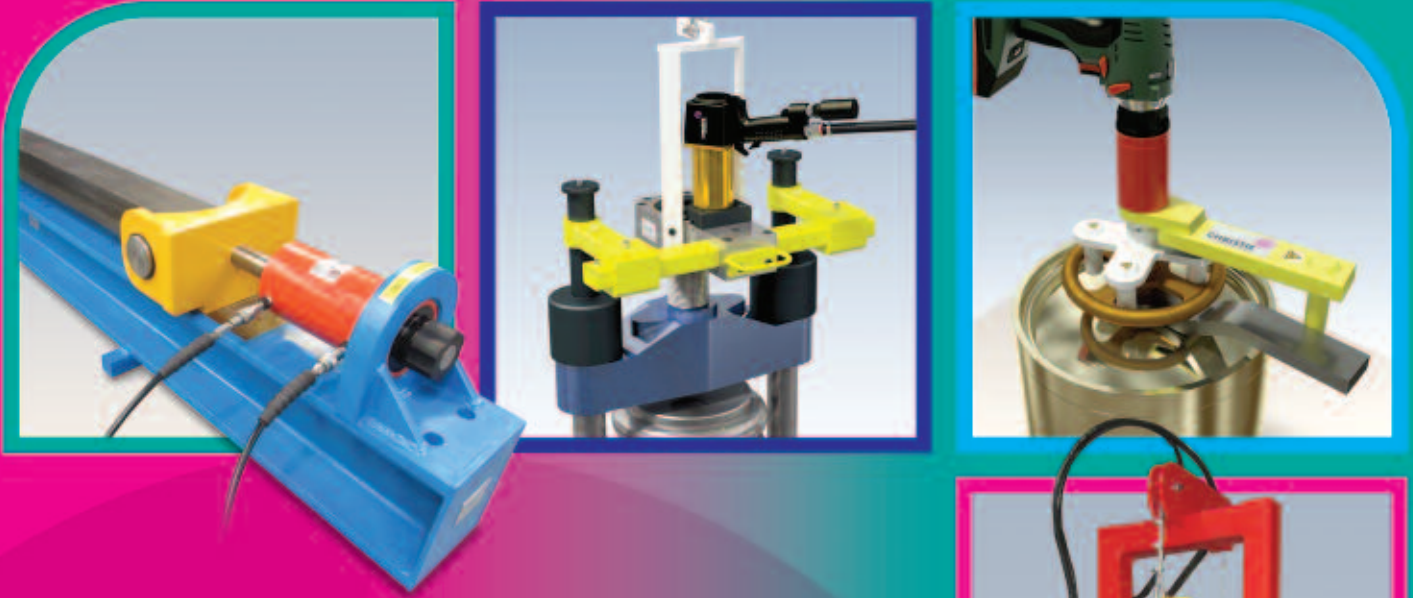




CHRISTIE

TOTAL TORQUE SOLUTIONS



Bespoke

engineered solutions



Bespoke • Tool Storage Solutions • **Offset Gearboxes**

Bush and Pin Installation / Extraction Systems • Portable Valve Operation Tool

Nose Extensions • Lubro Control Units • **Test Systems** • Hand Tools & Attachments

Torque Reaction Tooling • Special Sockets & Ancillaries • CBA - Christie Bolt Analysing Service



Bespoke

engineered solutions

Experienced in designing bespoke engineering solutions in a wide range of industries, W. Christie provide Total Engineered Solutions - meaning you only have to deal with one company during the complete project cycle and thereafter.

W. Christie will:

- **Assess the problem**
- **Propose a solution**
- **Design appropriate solution**
- **Manufacture at Rotherham facility**
- **Finish, test, and document**
- **Ensure suitability for purpose**

W. Christie are not restricted to specific engineering disciplines or industries. We work closely with clients from concept through to supply. Please visit the Bespoke Engineering Section of our website for additional project examples.

Site Assessment

Experienced W. Christie personnel will visit your site to select the most appropriate solution for your application.



Training

W. Christie provide training and competence assessment to ensure the correct and safe use of our equipment and systems.



Calibration, Maintenance & Servicing

For the best performance from our tools and equipment, W. Christie provide a comprehensive range of product services.





CHRISTIE

Bespoke Engineered Solutions

A Division of W. Christie (Industrial) Ltd

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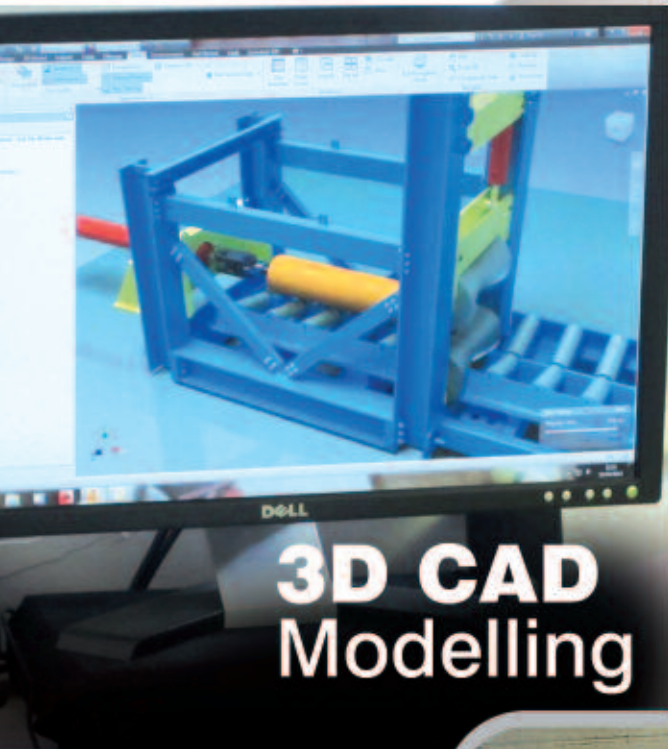


CHRISTIE

Bespoke Engineered Solutions
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Assembly

W. Christie's in-house facilities ensure that both standard manufactured products and Bespoke Engineered Solutions meet the high standards of quality the company has been supplying for over 50 years. This ensures W. Christie has control over all levels of a job, allowing you to deal with one company for the whole cycle of a project.



**3D CAD
Modelling**



CNC Milling...



Fabricating & Welding

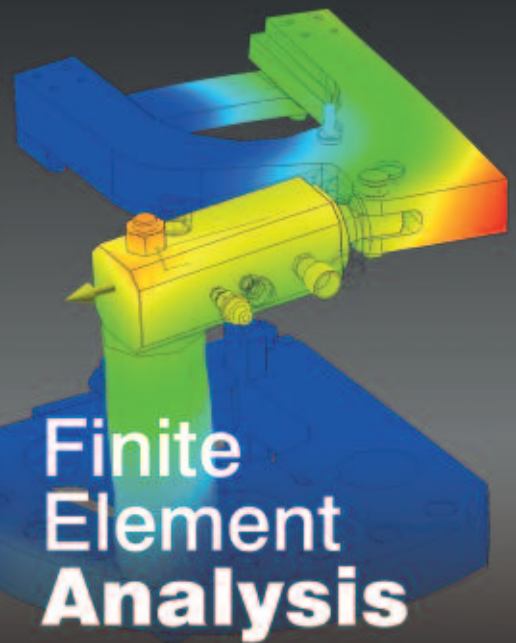
**In-house
facilities &
capabilities**

Full range of
**Performance &
Function Testing**

In-house
facilities &
capabilities



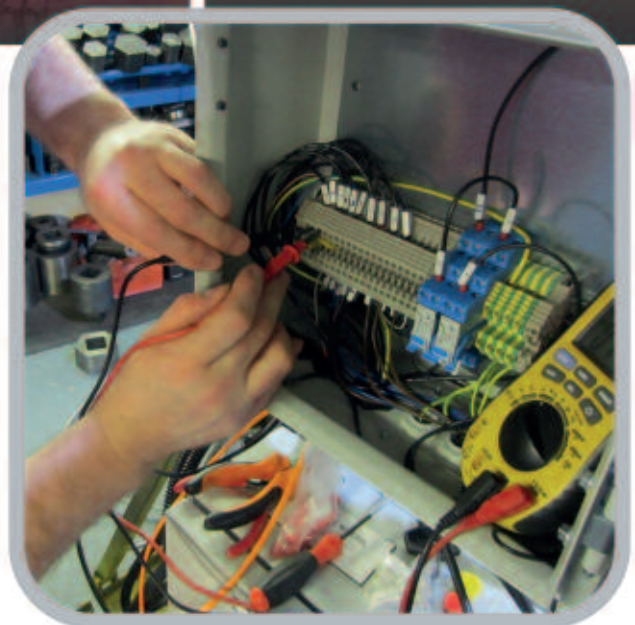
..& Turning



**Finite
Element
Analysis**



Coatings & Finishes



Control Systems

“Bespoke...
solutions for individual,
specific requirements!”

W. Christie work within a multitude of different engineering disciplines, solving torque problems and other engineering issues

W. Christie's experience across all sectors of industry, combined with the skills and capabilities of its engineering team, means it is able to solve an extensive range of engineering problems.

This section demonstrates just a small sample of the bespoke 'special' projects carried out by W. Christie.

Brake Actuator Lifting Clamp

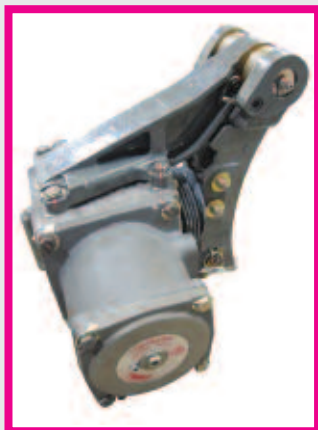
CASE STUDY: Brake Actuator Lifting Clamp

Application:

The safe lifting of a Brake Actuator unit within a train maintenance workshop.

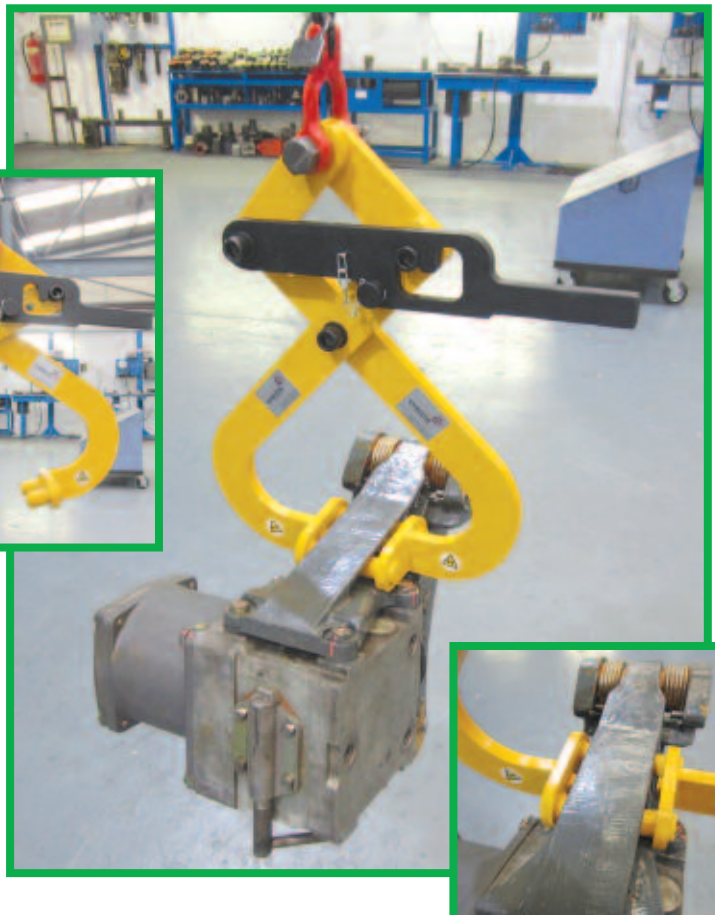
Problem:

The Brake Actuator unit has no obvious lifting points and has an awkward centre of balance.



Solution:

A scissor action Lifting Clamp, which securely locks onto the casting hollow of the Brake Actuator, lifting in a specific orientation. The Clamp is complete with a safety locking device and supplied with full lifting certification.



Drop Test Rig

Application:
Impact testing
of customer
components parts.

Problem:

To assess the high impact
capability of materials used in
pipeline protection.

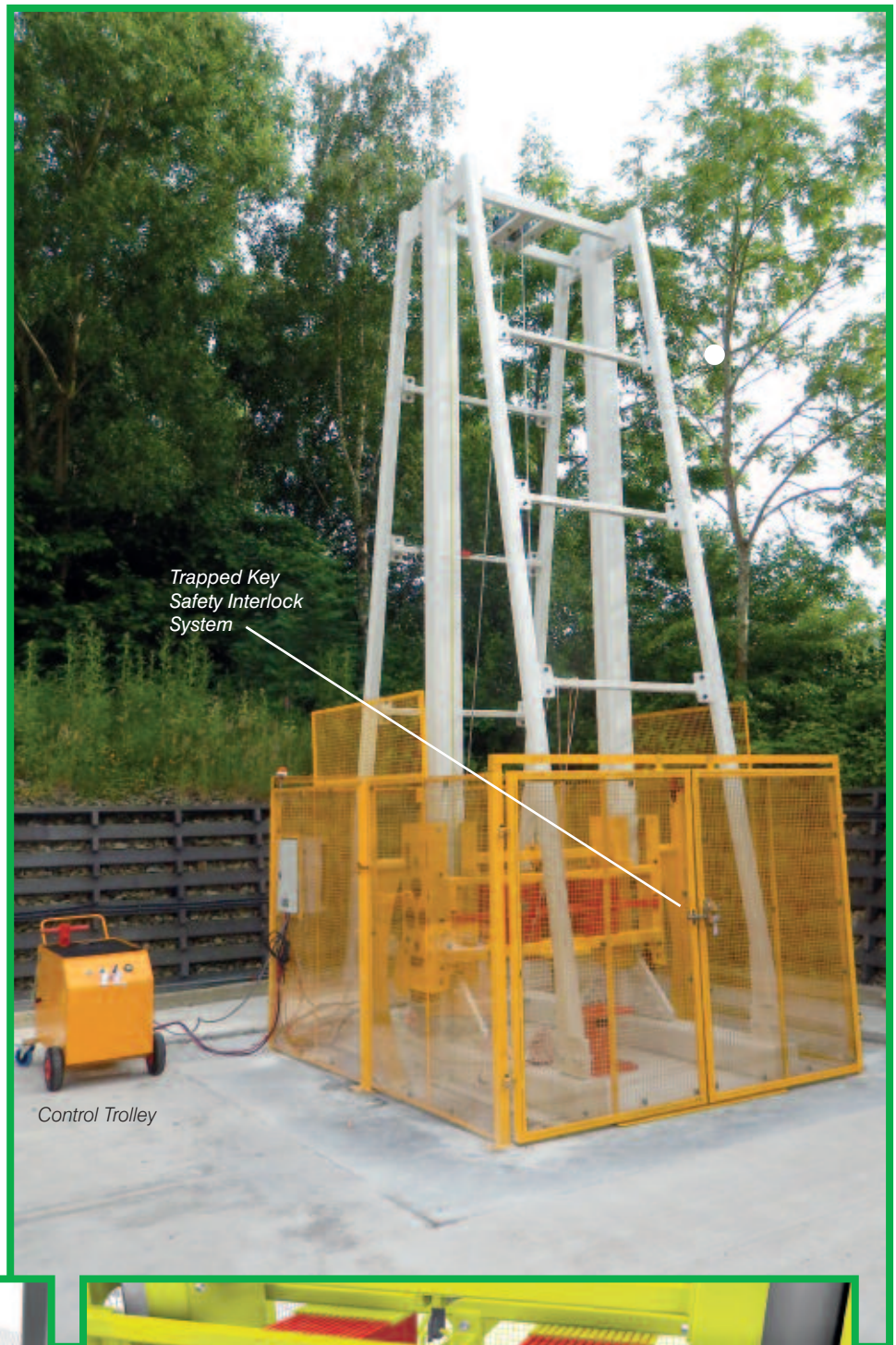
Solution:

Drop Test Rig

- Drop height of 4 metres
- Drop weight can be adjusted from 262 kg up to 1,013 kg in 25 kg increments
- Accommodates test components in the range of 28 mm up to 1,000 mm in diameter

Rig Dimensions:

3,202 mm (l) x 2,700 mm (w)
x 6,056 mm (h)

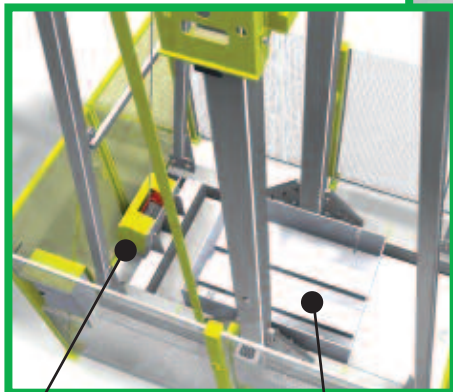


Trapped Key
Safety Interlock
System

Control Trolley

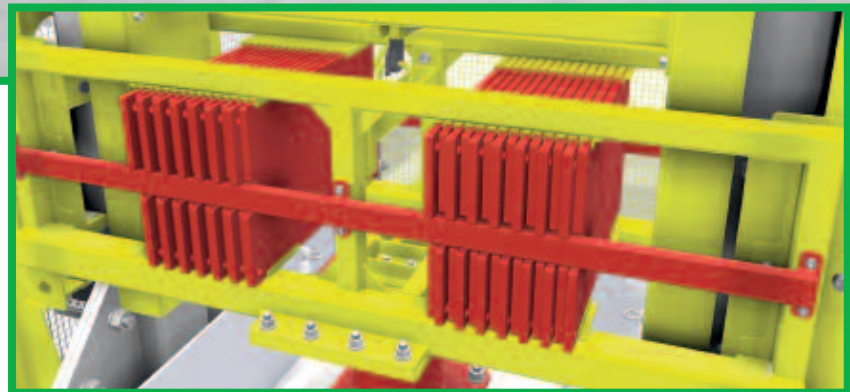


Interchangeable Hammer System



Winch

Impact Sand Pit



Removable weights

Large Keyed Socket

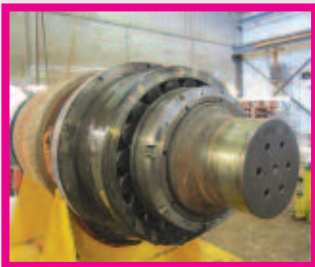
CASE STUDY: Large Keyed Socket

Application:

Removal and refitting of a large bearing lock nut on a compactor roller, within a mining environment.

Problem:

The bearing lock nut was repeatedly undoing, causing damage when in use. In order to make it secure a torque of 20,000 Nm needed to be applied directly.



Solution:

A bespoke 615 mm diameter keyed socket, consisting of 8 female keys.

The socket is for use with a pneumatic torque multiplier and a straight reaction arm to safely react on the repair support frame.



Special Reaction Platform

CASE STUDY: Special Reaction Platform

Application:

Tightening/untightening of a 2" A/F plug to 880 Nm, on a nuclear waste storage vessel.

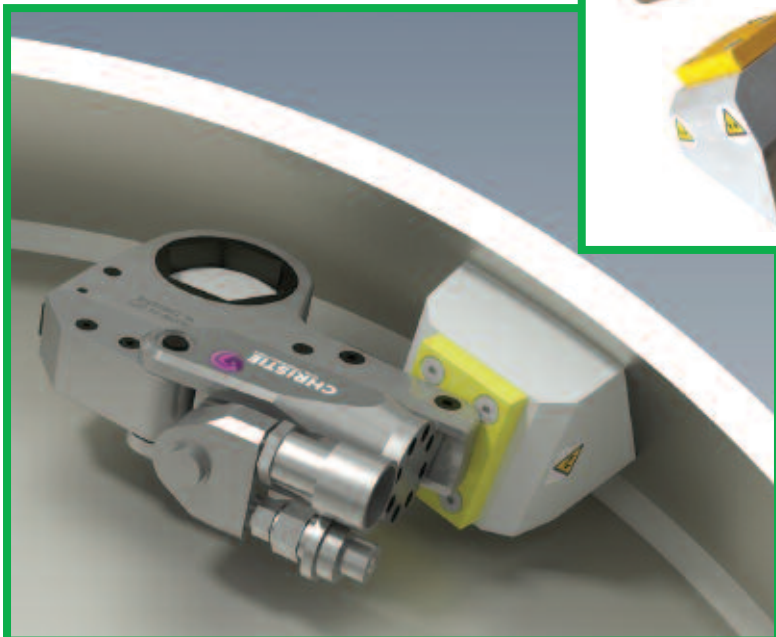
Problem:

The profile of the storage vessel is domed with a conical end. This limited access makes it difficult to get a safe and secure reaction.



Solution:

The reaction platform has a profile to exactly match the contour of the storage vessel. When used with the hydraulic torque tool it provides a flat surface for a secure and safe reaction.



Thermal Testing Chamber

Application:

Simulation of high ambient temperatures in a controlled environment for testing of components.

Problem:

Controlled testing of the effects of high ambient temperatures on products.

Solution:

Thermal Testing Chamber

- Accommodates a test piece and apparatus up to 4.2 m long by 0.6 m diameter
- Maintains a temperature of up to 40°C for long periods, with an accuracy of +/- 5%
- Allows components to be tested/monitored under load

Chamber Dimensions: 4,600 mm (l) x 900 mm (w) x 1,160 mm (h)



Control Panel

Strap Pre-tension Test Rig

Application:

Tensioning a Kevlar strap for testing purposes

Problem:

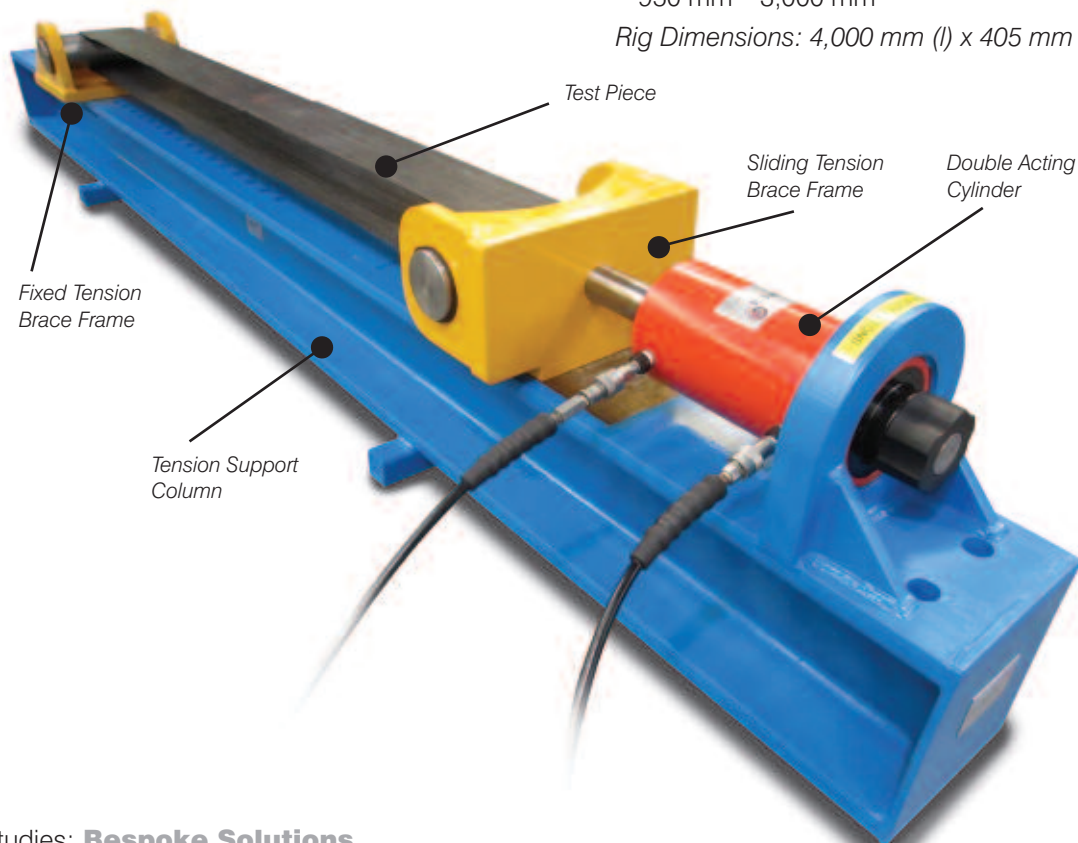
Determining the load/tension capability of straps for product development.

Solution:

Strap Pre-tension Test Rig

- Applies tension of up to 60 tonne with load holding capability
- Adjustable to variable strap lengths of 950 mm – 3,000 mm

Rig Dimensions: 4,000 mm (l) x 405 mm (w) x 567 mm (h)



Valving Rig

CASE STUDY: Valving Rig

Application:

Assemble and disassemble a full range of valves requiring torques of 150 – 3,400 Nm.

Problem:

To hold valves securely to allow a stable and accurate reaction, without causing damage to the valves.



Solution:

A valve rig consisting of a valve immobiliser, 2 x interchangeable C-RAD pneumatic torque tools (C-RAD 10 – Max. 950 Nm and C-RAD 34 – Max. 3,400 Nm), universal double reaction, zero weight balancer, and open hexagon reducers for easy valve insertion.



Load Cell Reaction Platform

CASE STUDY: Load Cell Reaction Platform

Application:

Fastening of cap screws onto a load cell.

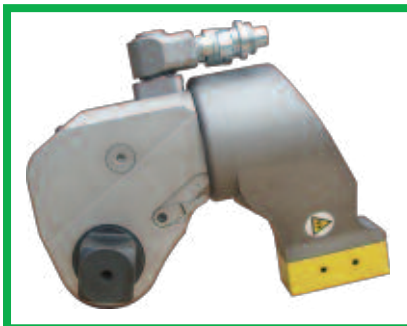
Problem:

To fasten cap screws consistently to a torque in excess of 5,000 Nm, without causing damage to the load cell.



Solution:

A reaction platform for use with a hydraulic torque tool, avoids the need to react on the load cell itself.



Reaction Platform



Mechanical Backing Tool

Application:

Arresting 4.1/4" A/F nuts when tightening and untightening the bolts on a valve flange.

Problem:

Insufficient clearance due to the contour of the valve and close proximity of the nut means a conventional flogging spanner will not fit.



Solution:

A mechanical backing tool, with a precision fit and cut-away hexagon, to hold/arrest the nut while a torque tool tightens the bolt at the head on the reverse side of the flange.



CASE STUDY: Mechanical Backing Tool

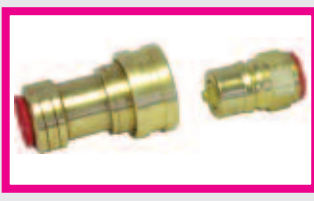
Coupler Connecting Tool

Application:

Connecting and disconnecting of large 43 mm diameter quick-release couplings.

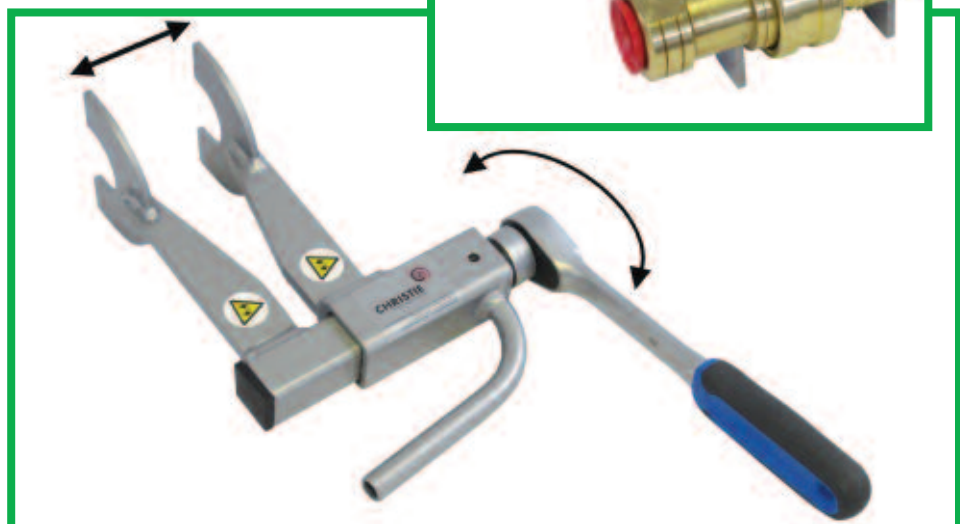
Problem:

Connecting and disconnecting couplings, which may be corroded, and in difficult access areas, can be problematic.



Solution:

A coupler connecting tool, with coupler holding shoes, designed to precisely fit each coupler and a universal ratchet attachment that makes operating the tool easy.



CASE STUDY: Coupler Connecting Tool

Underground Train Bogie Hydraulic Lifting System

CASE STUDY: Underground Train Bogie Hydraulic Lifting System

Application:

Lifting Underground Train Bogies to allow general maintenance of the bogie and reprofiling of wheels.

Problem:

The maintenance depot workshop has height and width restrictions, together with varying rail heights.



Height restriction = 180 mm

Solution:

A 20 tonne hydraulic lifting system that is manoeuvrable, stable and effortless to use. It is also adjustable for different working heights and is configured to suit individual depots.



Train Coupler Damper Disassembly System

CASE STUDY: Train Coupler Damper Disassembly System

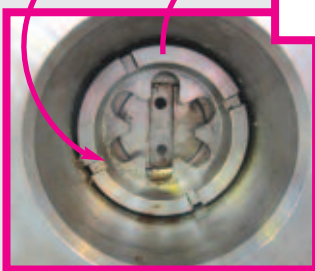
Application:

Disassemble and overhaul of a train preloaded coupler damper.

Problem:

The coupler dampers are in service for lengthy periods, requiring a torque of 12,000 Nm to disassemble. The lock nut was also in a recess, making access difficult.

Lock Nut



Solution:

A disassembly system designed to securely retain the coupler and act as a safe reaction for the pneumatic tool.

A special peg socket to fit exactly within the female form of the lock nut, ensures the process is stable and safe.



Compression Test Rig

Application:

Compression testing of cylindrical structures.

Problem:

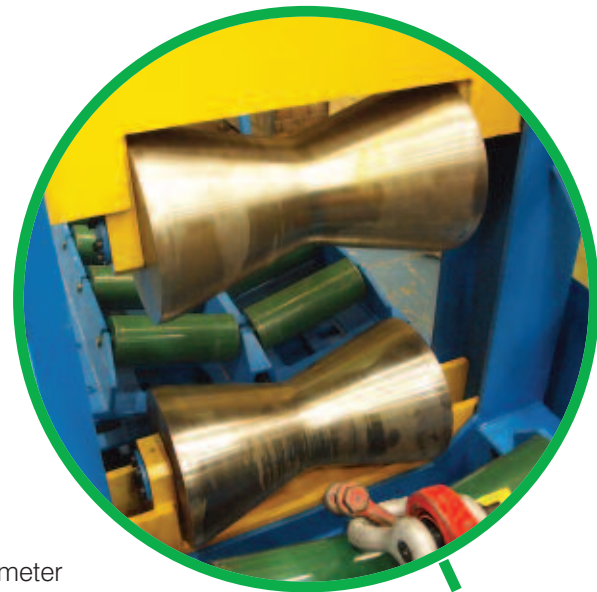
Simulation of the effects of compressive loads and pull forces, under controlled conditions, for the purpose of product development.

Solution:

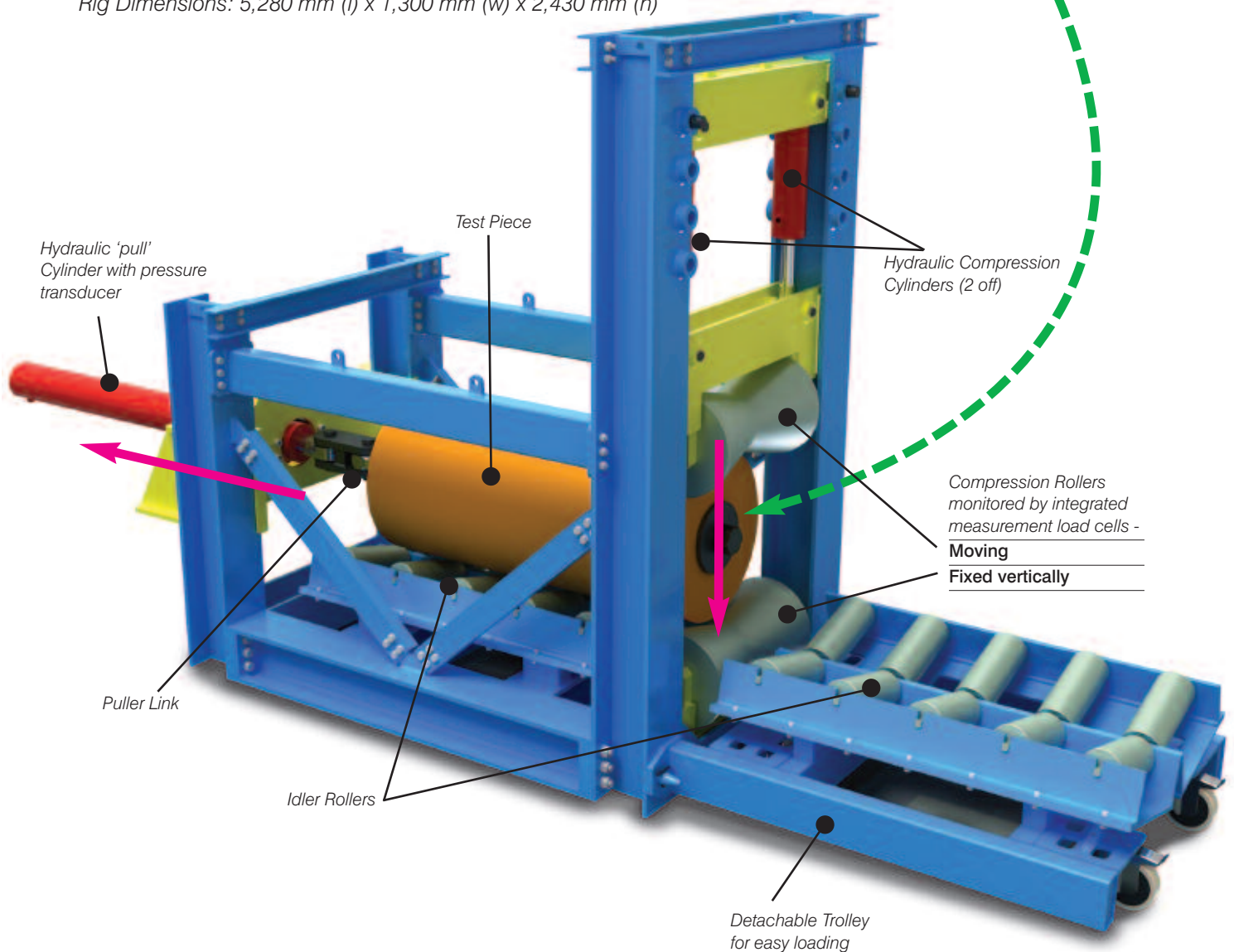
Compression Test Rig

- Pulling force of 20 tonne and pulling distance of 1,400 mm
- Overall compression force of up to 32 tonne
- Compression testing of objects from 160 mm to 700 mm diameter

Rig Dimensions: 5,280 mm (l) x 1,300 mm (w) x 2,430 mm (h)



CASE STUDY: Compression Test Rig



Down Coiler Mandrel Hydraulic Torque Wrench

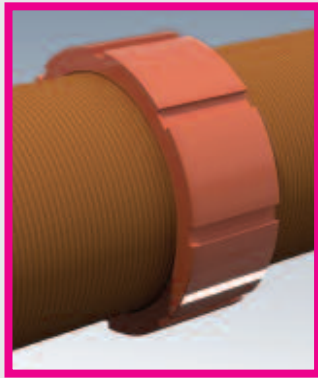
CASE STUDY: Down Coiler Mandrel Hydraulic Torque Wrench

Application:

Tightening/Untightening of locking nuts up to 30,000 Nm on roller bearings on a steel mill.

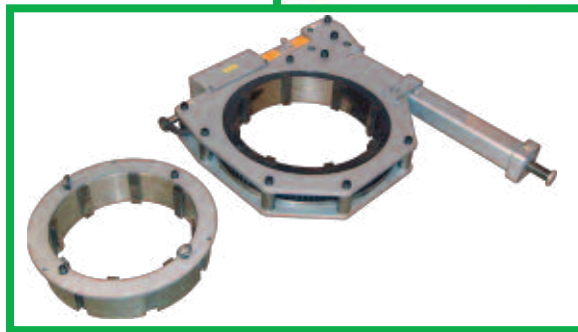
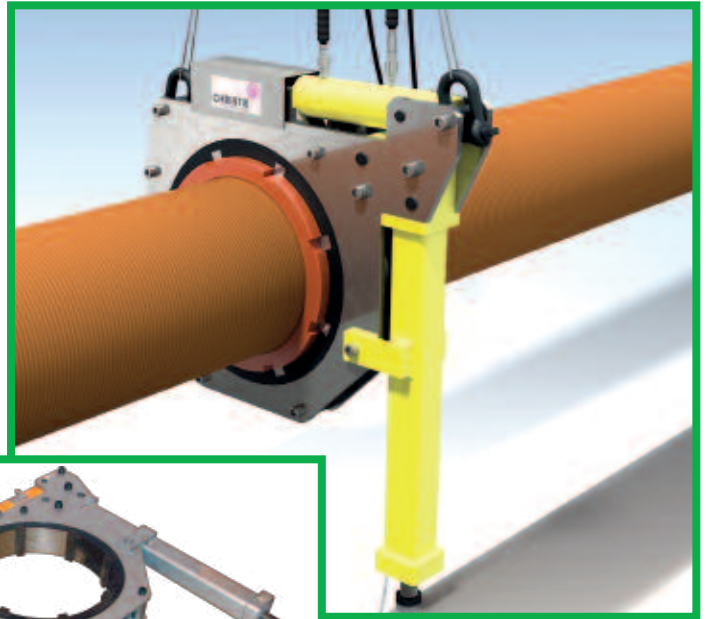
Problem:

The large lock nut needs to be rundown a long shaft at high torque.



Solution:

Large bespoke direct fit hydraulic torque wrench, with integral reaction and reducing sleeves.



Train Bogie Stand

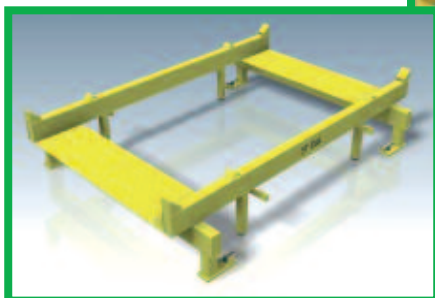
CASE STUDY: Train Bogie Stand

Application:

Access to a train bogie over a maintenance pit to give a suitable working height.

Problem:

Ensuring stable working conditions at a suitable height for working on the train bogie.



Solution:

A bogie stand, which straddles the maintenance pit, giving safe, secure, and easy access at the correct working height.



Oil Pump

Application:

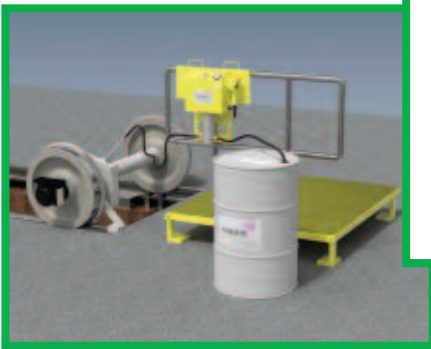
Delivering a measured 2.5 litres of gear oil from an oil drum into a gearbox filler hole.

Problem:

Ensuring a consistent and accurately measured quantity of oil is transferred to the gearbox.

Solution:

A portable battery oil pump, with a 41 second delivery time, achieving 60 - 100 refills between charges. The system also includes a top-up feature.



CASE STUDY: Oil Pump

Scissor Lift (Elevator System)

Application:

Removal and refitting of heavy modular components from the underside of trains.

Problem:

Limited access and the manoeuvrability of a heavy load.

Solution:

Electrically (battery) driven hydraulic scissor lift for transporting and lifting heavy loads. Models available for lifting up to 3,000 kgs.

Model shown – 1,000 kgs lift to a max. height of 1.6 m.



CASE STUDY: Scissor Lift (Elevator System)

Manufacturing Assembly Trolley

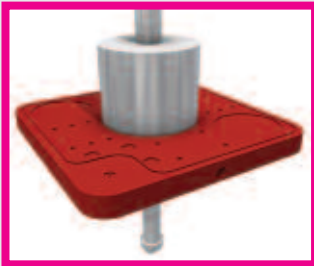
CASE STUDY: Manufacturing Assembly Trolley

Application:

Movement and handling of manufactured assemblies in a factory.

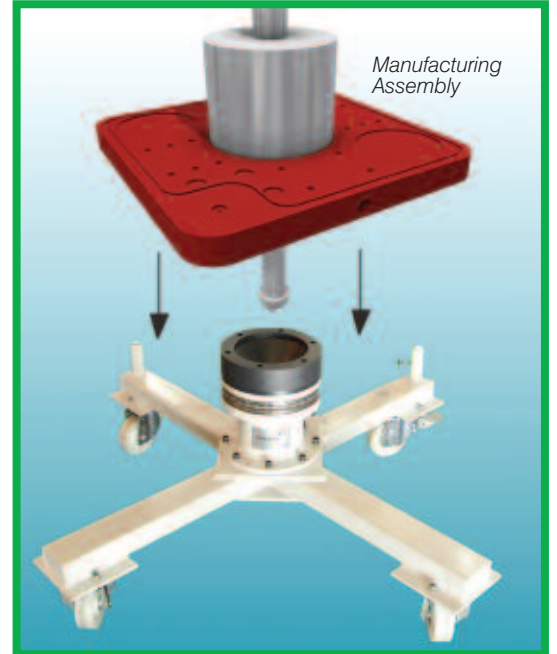
Problem:

The assemblies consist of electronics, requiring careful handling and rotating into a working position. They can weigh up to 1,800 kgs.



Solution:

A bespoke wheeled trolley, with an integral brake mechanism and a load bearing capability in excess of 1,800 kgs. The trolley also consists of a central column capped with a special material to prevent mechanical damage and reduce the risk of contamination. High quality bearings are used for ease of rotation when positioning within the work station.



Low Profile Tooling

CASE STUDY: Low Profile Tooling

Application:

Removal of flange linkage on forging press valve housing.

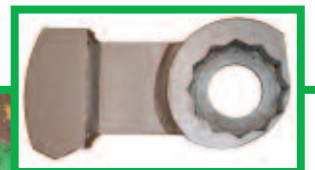
Problem:

Very limited clearance between hexagon points and pipework, with overall limited access. Previous manual method rarely achieved a 100% seal on the gasket.



Solution:

Low profile LP7 hydraulic torque tool capable of 9,500 Nm output, with thin wall wrench arms, capped and reinforced.



Train Shock Absorber Fixture

Application:

Removal of locking rings on the hydraulic chambers of train shock absorbers.

Problem:

The shock absorbers are under compression and subject to wear, having been in service.

This makes them difficult to disassemble.

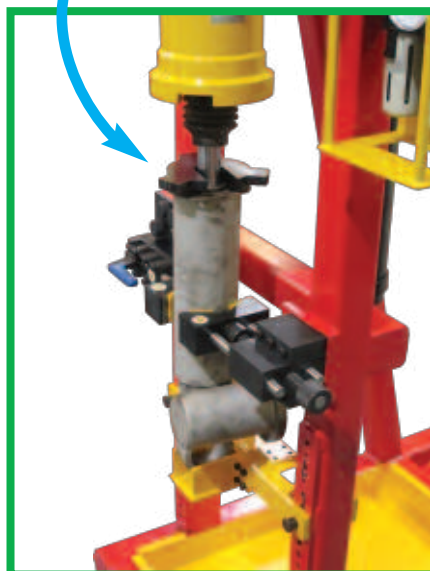
The units are also awkward to secure/hold with stability when removing the lock rings.



Solution:

Telescopic Shock Absorber Fixture with C-RAD 14 Pneumatic Torque Tool capable of 1,350 Nm.

This system greatly improves productivity, and securely holds the shock absorber.



CASE STUDY: Train Shock Absorber Fixture

Jigger Pick Maintenance Fixture

CASE STUDY: Jigger Pick Maintenance Fixture

Application:
Overhaul of air powered
Jigger Pick tools.

Problem:

Difficult to disassemble and reassemble the Jigger Pick units due to weights (~25 kgs), the complex shape, the torque required (up to 200-300 Nm), and the high manual impact required to remove some of the fixings.

Removal and reattachment of all fasteners, roll pins, c-lock pins, and couplings, requires the Jigger Pick to be held securely in a suitable orientation.

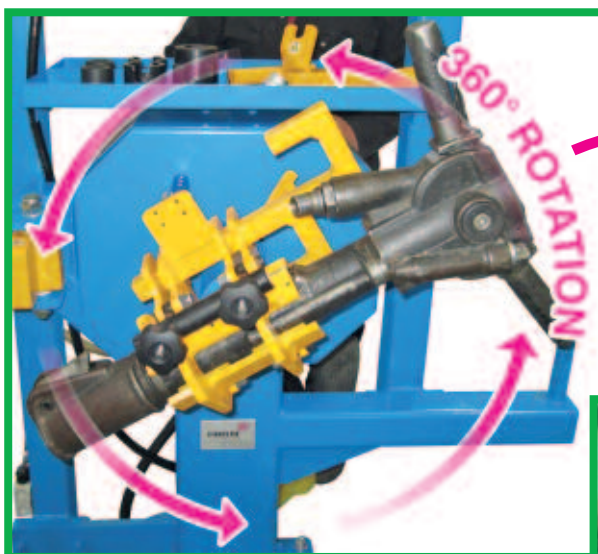


Solution:

The system incorporates a hoist to remove manual handling, combined with a 360° rotating fixture allowing secure holding and ergonomic positioning of the Jigger Pick for complete strip-down and reassemble of all components. The system also includes a C-RAD 5 (500 Nm) pneumatic torque tool for the removal/refitting of couplings and front end assembly bolt.



This system can be adapted/redesigned for use in other workshops, to suit your specific handling requirements



Remote Hydraulic Torque Tool System

Application:

Adjustment of guide rollers on a steel tube rolling mill.

Solution:

Electrically driven hydraulic power pack and 6 x Hyspan 34 Remote (continuous rotation) hydraulic torque tools with 90° gearboxes, provide sufficient torque and access within the height restriction.

Each Hyspan torque tool and reaction is mounted on the square drive of a guide roller assembly, allowing independent adjustment of the guide roller.

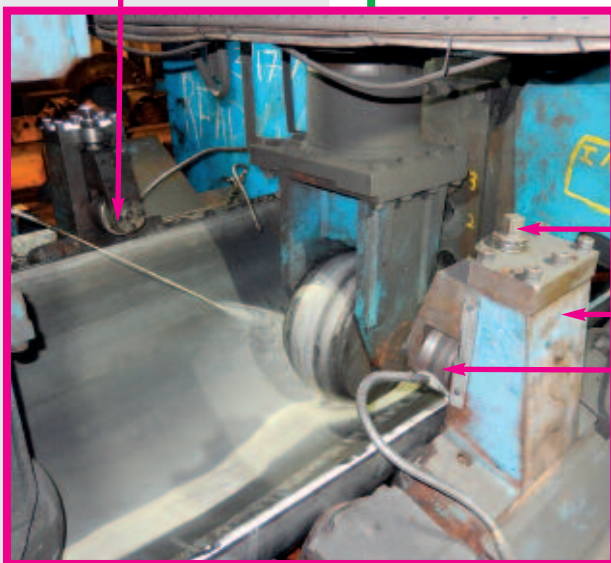
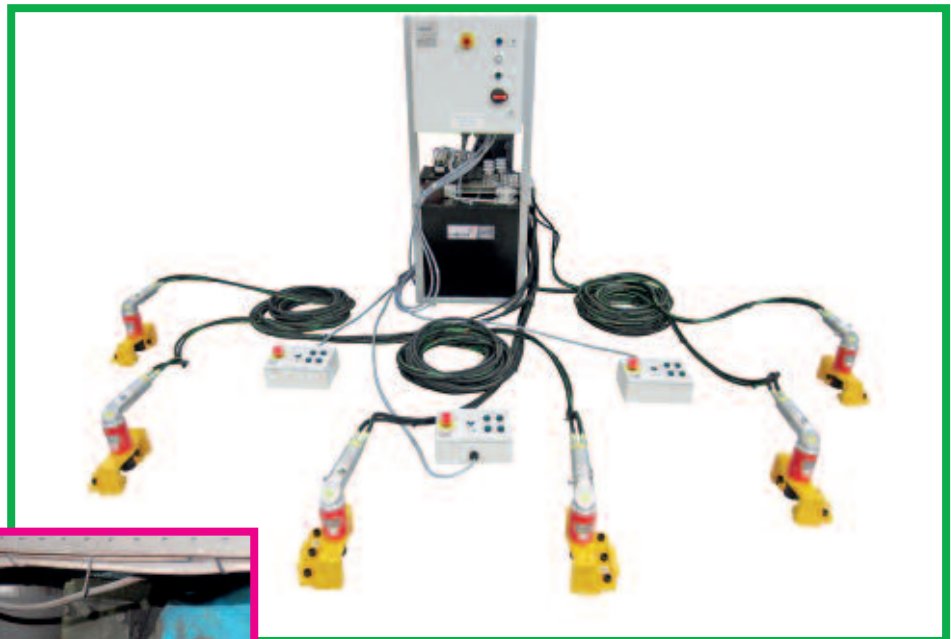
Problem:

Restricted height makes it difficult to access the bolts using standard tooling.

A torque of 2,500 Nm is required, but limited air supply restricts the choice of tooling.

Increasing the tool size to achieve the required torque is not an option due to the physical restriction of the site.

Guide Roller

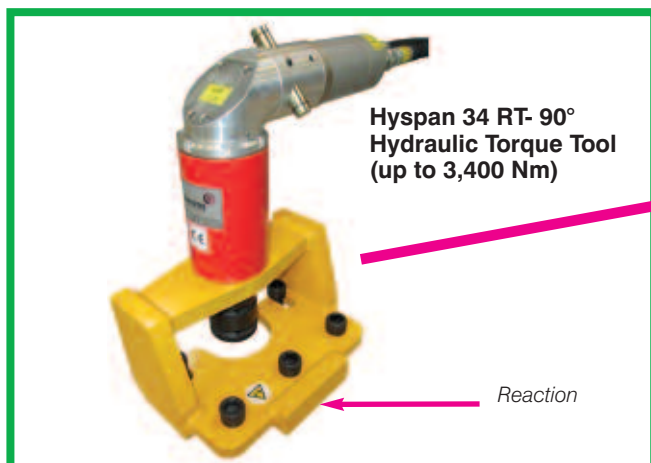


Square Drive (for adjustment)

Guide Roller Assembly

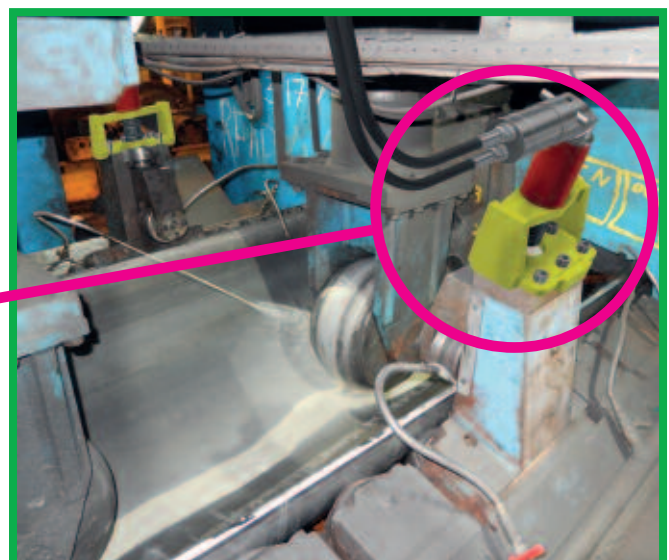
Guide Roller

Hyspan Torque Tools in-situ



Hyspan 34 RT- 90° Hydraulic Torque Tool (up to 3,400 Nm)

Reaction



Stud Removal Tool

CASE STUDY: Stud Removal Tool

Application:

Removal of a threaded stud from an engine cylinder head.

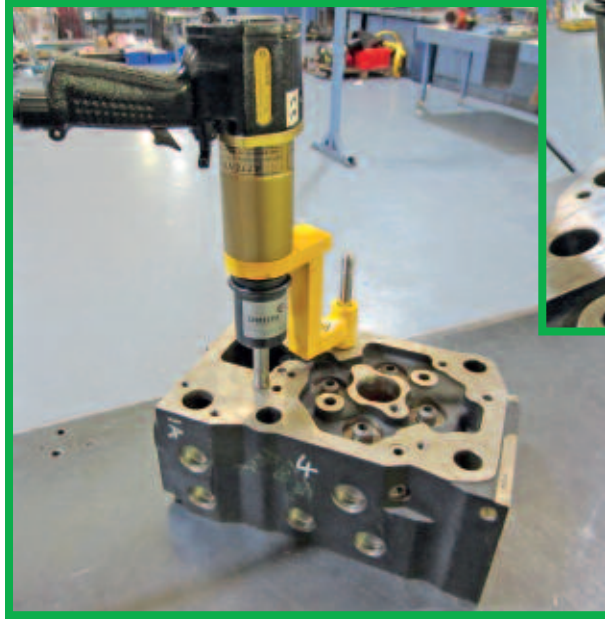
Problem:

The studs are difficult to remove and need to be gripped securely, whilst preventing the cylinder head from moving.



Solution:

The W. Christie Stud Removal Tool removes the studs efficiently and safely, without the need to secure/clamp the cylinder head.



Water Powered Hydraulic Torque Multiplier

CASE STUDY: Water Powered Hydraulic Torque Multiplier

Application:

Removal of Stainless Steel bolts on the seismic brackets of container racking in a spent nuclear fuel handling pond.

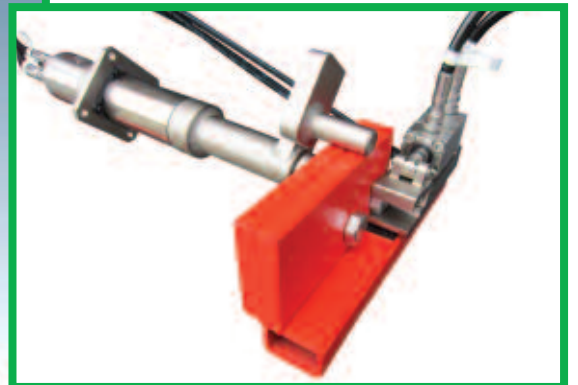
Problem:

The bolts are at a depth of 4 metres in contaminated water and have been in place for many years.



Solution:

A water (analar grade) hydraulic torque multiplier capable of 2,000 Nm, used in conjunction with a hydraulic bolt arrestor clamp giving a torque of up to 800 Nm. All submersed components are manufactured from non-contaminating materials.

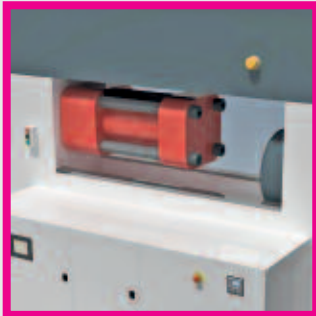


XYZ Table

Application:
Supporting a heavy machine component during maintenance.

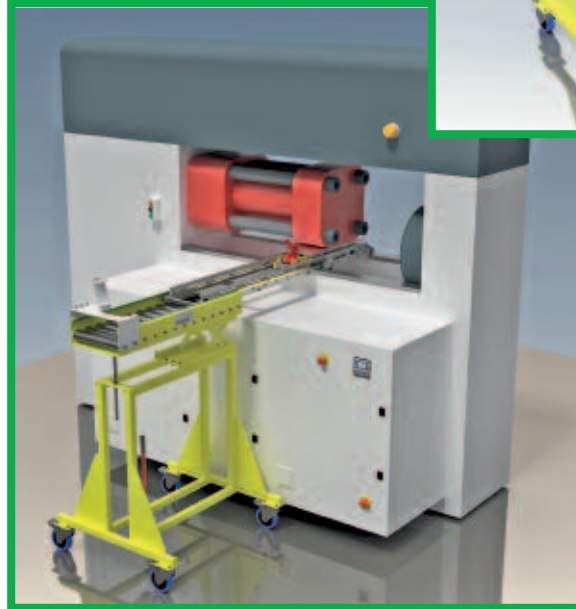
Problem:

The site has a height restriction with no overhead access for a crane.



Solution:

Trolley system with height adjustable telescopic bed and inbuilt manual jacking system.



CASE STUDY: XYZ Table

Propeller Hub Assembly System

Application:
Removal and installation of a circular lock nut on a ship propeller hub.

Problem:

High torque is required to unfasten the large lock nut. Removal must also be achieved without damage to the high cost propeller hub.



Solution:

A system capable of 50,000 Nm, consisting of a pneumatic torque multiplier, special double reaction, drive adaptor, and associated framework for holding the propeller hub.



CASE STUDY: Propeller Hub Assembly System

Twin Spindle, Cantilever Torque Tool Trolley System

CASE STUDY: Twin Spindle, Cantilever Torque Tool Trolley System

Application:

Torque tightening of bolts on a Tractor Auxiliary Pick-up Hitch.

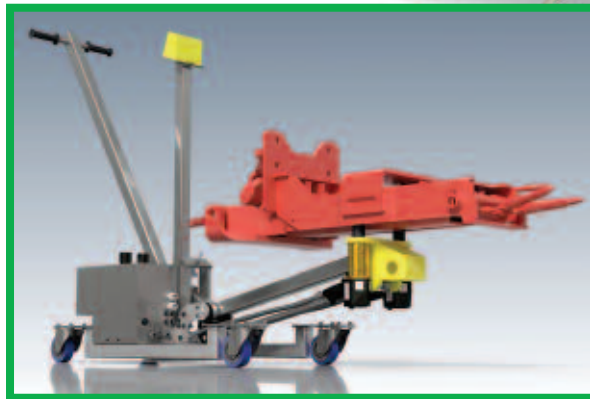
Problem:

The 24 mm A/F hexagon recessed fasteners are obstructed by the tractor hitch unit, which is also low to the ground, meaning there are access problems and health and safety issues.



Solution:

A twin spindle pneumatic Torque Tool System (2 x C-RAD 10L – 950 Nm each), integrated into a cantilever trolley system with camera and screen for ease of socket alignment.



Electronic Bolting System

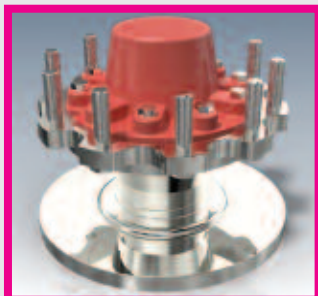
CASE STUDY: Electronic Bolting System

Application:

Assembly of wheel hub unit involving tightening the inner ring of bolts.

Problem:

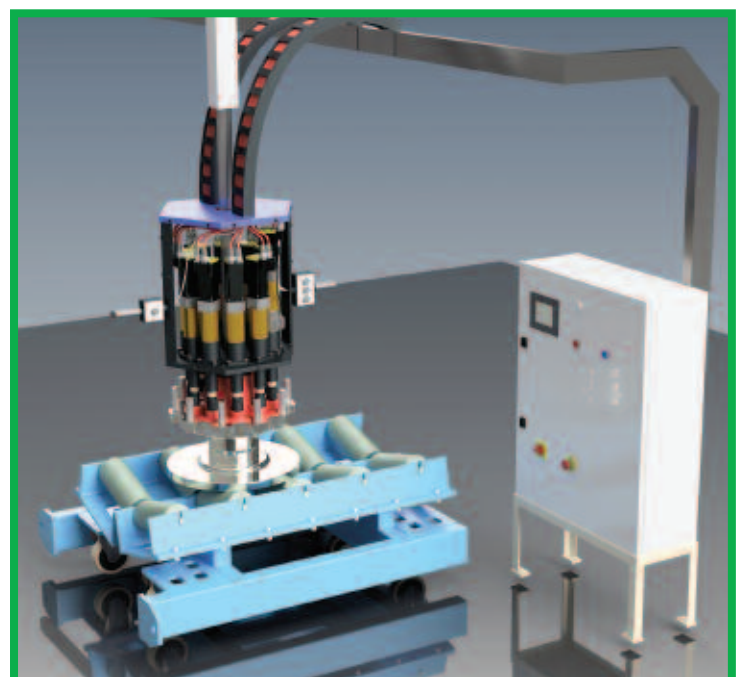
Tightening of the bolts involves overcoming the obstructions of the wheel hub structure and preventing rotation of the unit on its bearing during tightening.



Solution:

A 10 Spindle Electronic Bolting System consisting of electro servo motors, telescopic nose extensions on each tool for ease of locating, and a powered vertical actuator. Each independent tool reacts against one another, preventing the hub rotating on its bearing during bolt tightening.

The system also speeds up the process with the simultaneous tightening of 10 bolts with even pull up, by a single operator.

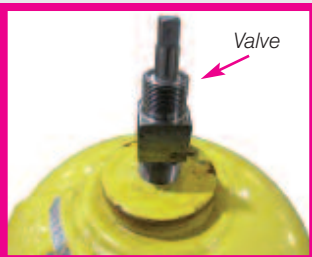


Gas Bottle Valving System

Application:
Torque tightening & removal of gas bottle valves.

Problem:

Securing the gas bottles whilst tightening the valves to a torque of 350 Nm, and also when removing the valves, that may have seized-up.



Solution:

A fully guarded, pneumatically activated system which is fast, safe and accurately delivers a measured torque.

The push button system incorporates an automated clamping mechanism which provides stability in securing different sizes of gas bottle.

Lubro Control Unit

C-RAD Pneumatic Torque Tool

Double Reaction Plate

Socket

Valve Adaptor

CASE STUDY: Gas Bottle Valving System

Tool Storage Solutions

designed and built for your new & existing tools

Just some of the trolleys and cases manufactured and supplied by W. Christie, most of which are custom built to customer's specific requirements. From wheeled versions with lockable compartments to those with lifting lugs and grab handles, the options are endless!



Detachable Trolley



Raised Base for Fork Lift Trucks



Large 0.9 m³ Storage Capacity



24 Tool Sections



Lifting Handles



Retractable Wheel Mechanism



Wheeled with Brakes



Integral Test Equipment



Integral Hose Reel



Gas Springs



Compartments & Storage Cupboard

Designed and built to your requirements

Tool Trolleys with 4 load tested lifting lugs

Wheeled Trolleys with brakes

Removable Wheels

Grab Handles

Multiple divided sections for individual tools

Gas spring lid systems

Raised base for using with fork lift trucks

Mobile benches

Retractable wheel mechanisms

Storage cupboards

Fully lockable units

...the options are endless!

We also supply trolleys and cases for any use... not just tool storage!

...call **01709 550088**



Aluminium Boxes



CHRISTIE
TOTAL TORQUE SOLUTIONS

“Why use a Christie Offset Gearbox?”

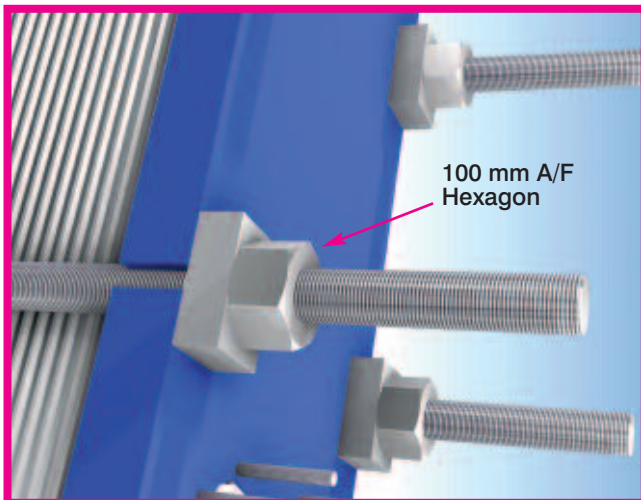
W. Christie Offset Gearbox (COG)

The Christie Offset Gearbox (COG) facilitates access when there is no direct line of sight, or when a nut needs to be run down a stud so long that a socket would not be practical.

Christie Offset Gearboxes are designed for the tightening and untightening of fasteners with protruding threads (Problem 1) and/or restricted access (Problem 2).

Problem 1:

Protruding Thread

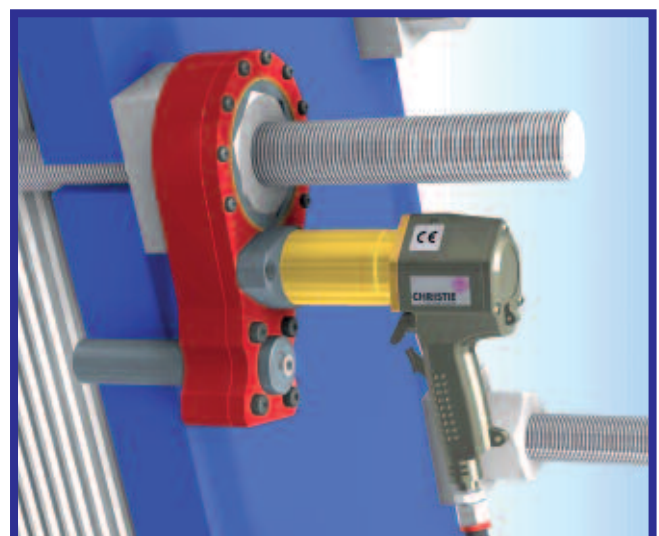
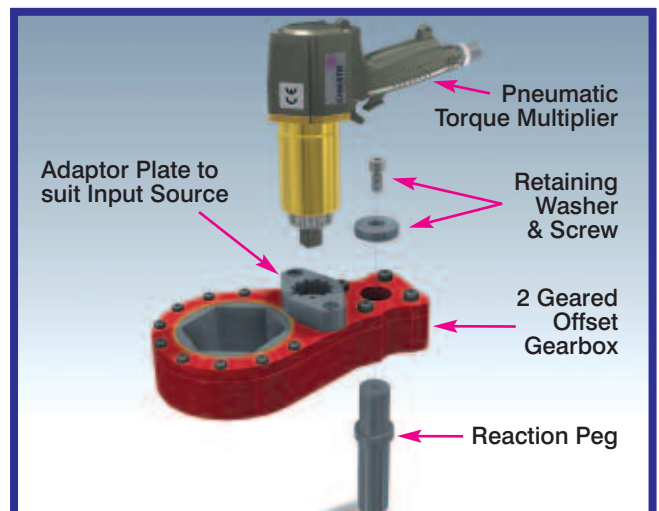
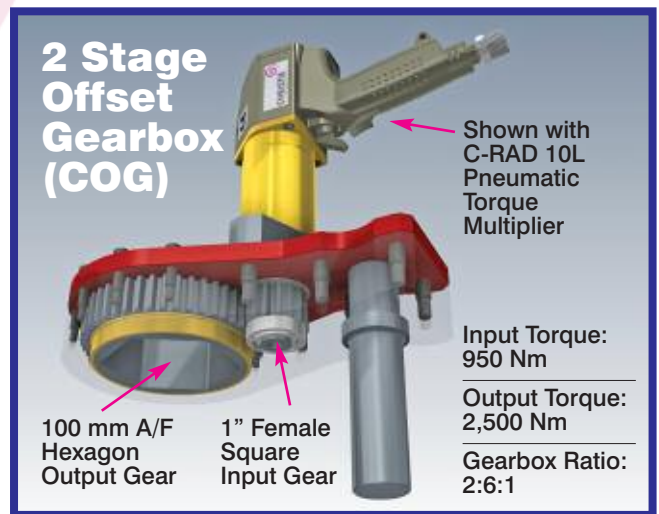


W. Christie standard 2 Stage Offset gearboxes (COG as shown) can be used for the continuous tightening of tie rod nuts on plate heat exchangers, to compress the sealing gaskets to a measured distance.

Often these tools are used in pairs for even compression. These Offset Gearboxes can also be used with a VC-RAD Electric Torque Tool.

Solution:

Generic Offset Gearbox designed for plate heat exchangers.



Solution:

Problem 2:

Restricted Access



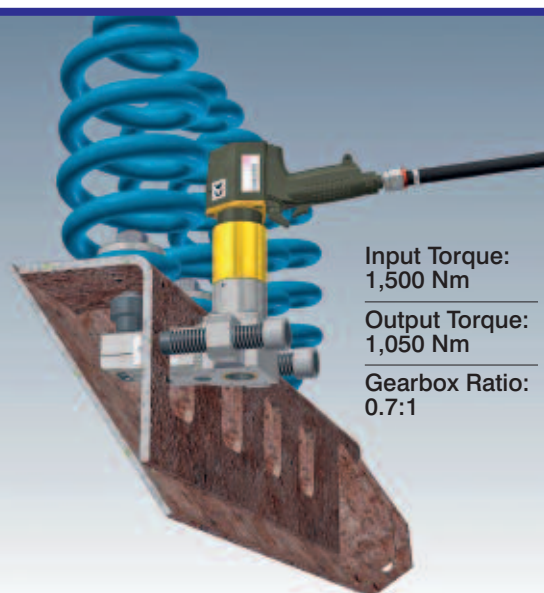
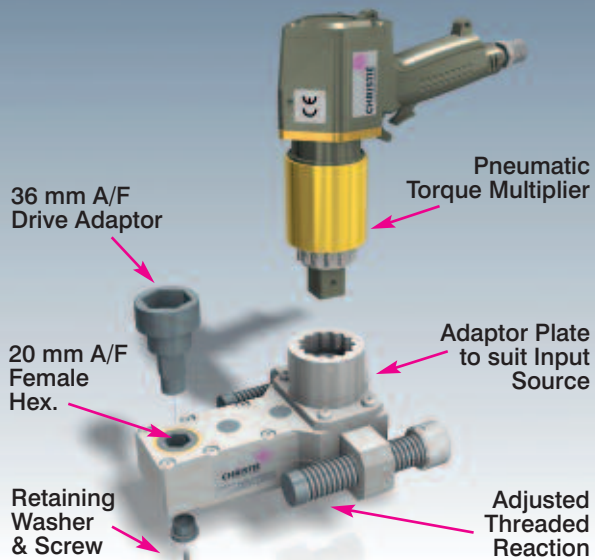
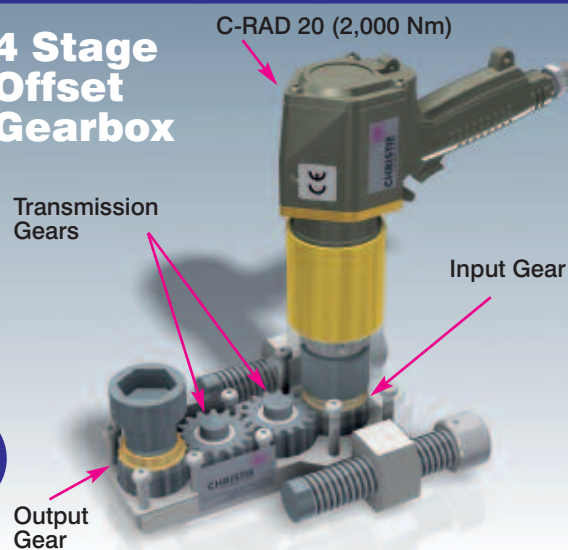
By means of a gear train, torque and turning motion is transmitted to the bolting application, offsetting the gearbox/drive point of a standard tool.

In these situations an offset gearbox will give access to the bolts, allowing a safer and quicker bolting procedure.

Each gearbox is designed using 3D and stress analysis software to minimise friction and torque losses.

W. Christie's manufacturing processes involves precision CNC machining and heat treatment of the highest quality materials.

4 Stage Offset Gearbox



Input Torque:
1,500 Nm

Output Torque:
1,050 Nm

Gearbox Ratio:
0.7:1

Examples of access problems overcome with

W. Christie Offset Gearboxes

W. Christie Offset Gearboxes



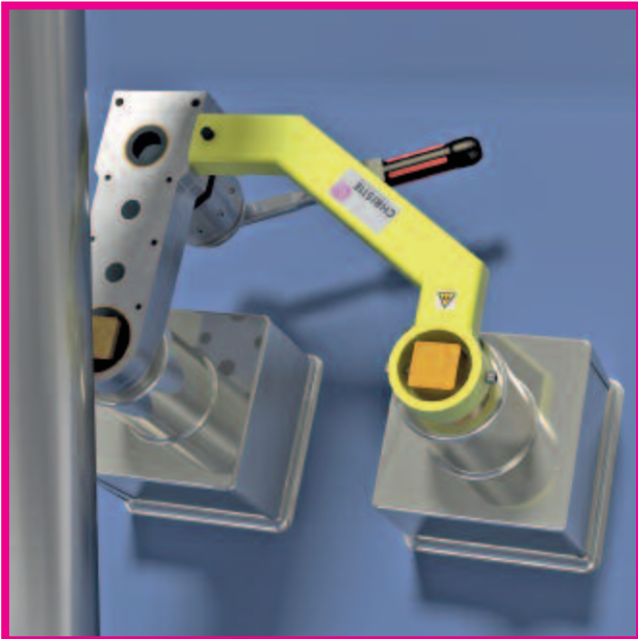
Circular Nuts on offshore oil flange

Running down a 130 mm round nut on 400 mm length of thread.



Bearing Lock Nut

Unfasten & tighten HM-46T locking collars on roller bearings.



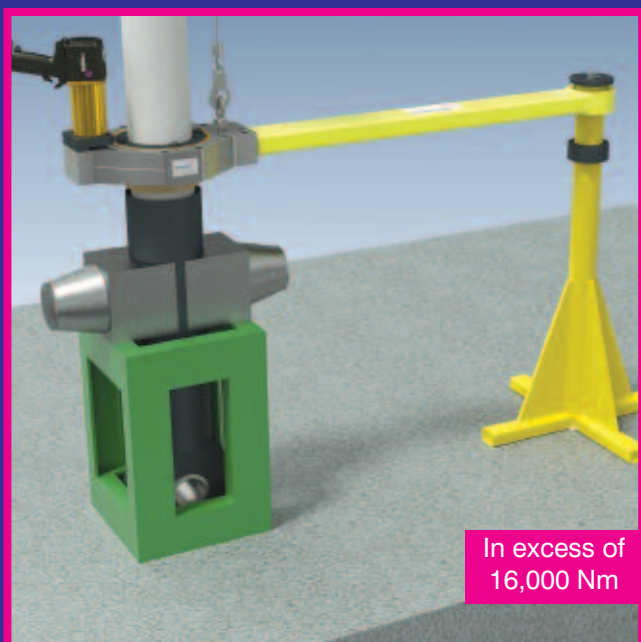
Safety Critical Valve

Tightening of an assembly frame bolt.



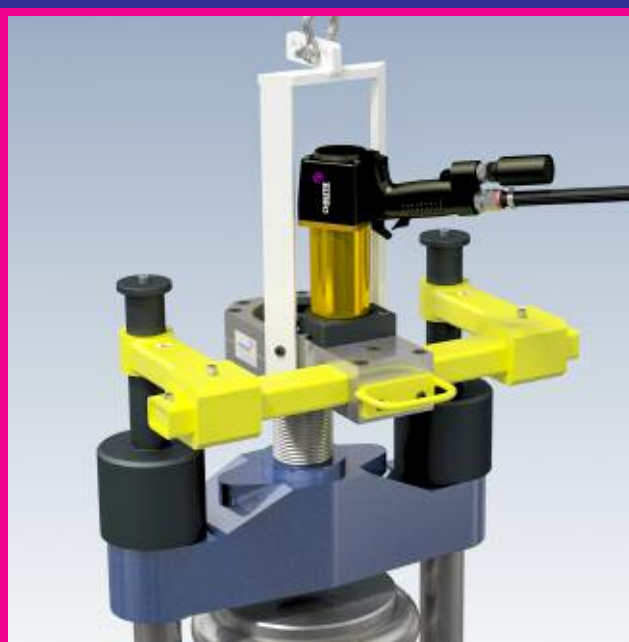
Train Traction Motor Feet Bolts

Tightening and untightening of bolts which secure the motor onto the train bogie.



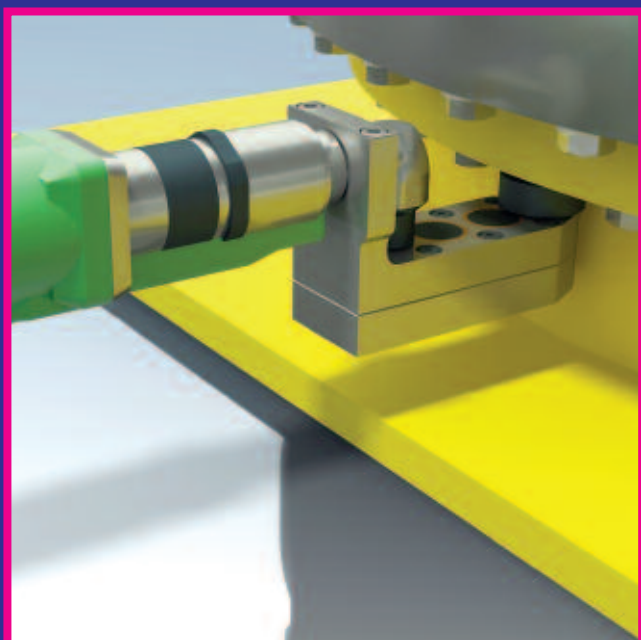
Train Autocoupler

Tightening/untightening of large keyed lock nut on train autocoupler assembly.



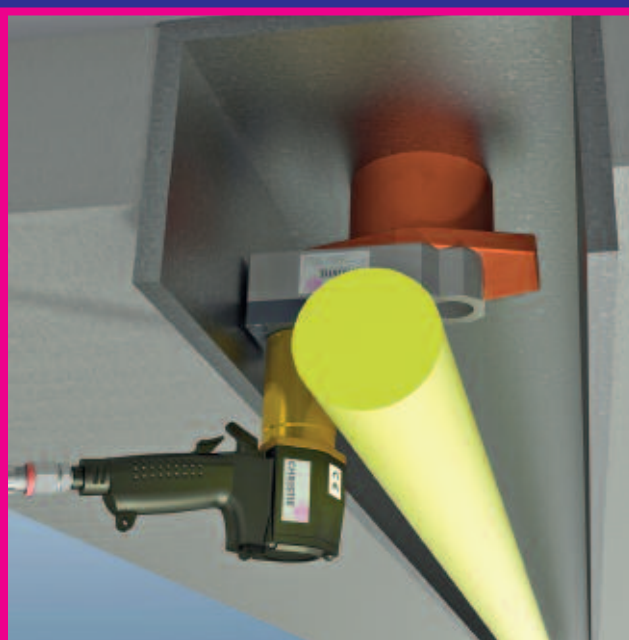
Safety Valve

Tensioning a spring on a valve.



Crane Slewing Ring

Replacing of crane slewing ring in a nuclear environment.



Train Bogie Centre Casting Bolt

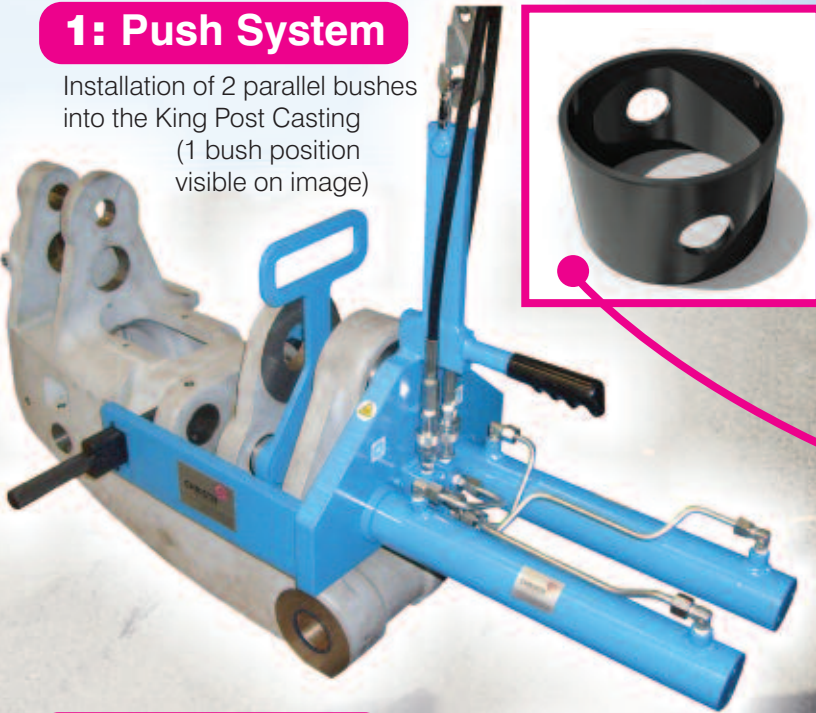
Replacement of bolts on a train bogie damper.

Bush and Pin Installation / Extraction Systems

W. Christie Hydraulic Installation / Extraction Systems are designed to operate with sufficient force to safely install and extract steel bushes and pins with precision, whilst overcoming obstructions inherent in the excavator casting.

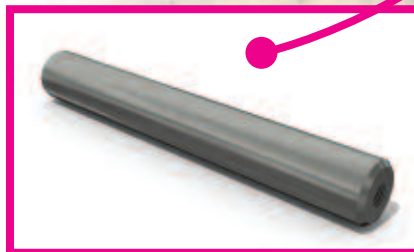
1: Push System

Installation of 2 parallel bushes into the King Post Casting (1 bush position visible on image)



2: Pull System

Inserting a pin to connect the boom of an excavator to the King Post Casting





3: Pull System

Installation of 2 opposing bushes simultaneously into a King Post Casting



4: Push System

Inserting 3 bushes simultaneously into a King Post Casting (2 bush positions visible on image)



Portable Valve

Operation Tool

The safer and quicker method of valve actuation



W. Christie Method Electrically Powered

The VC-RAD 6 (110V Electrically Powered) Portable Valve Operation Tool with Telescopic Extension Bar for use on valves below ground.

- (A) One Person Operation -** Single Reaction Plate
- (B) Two Person Operation -** Double Sided Reaction Plate for higher torques
- (C) For the highest torques,** the wheel of a commercial van can be parked on the Single Reaction Plate

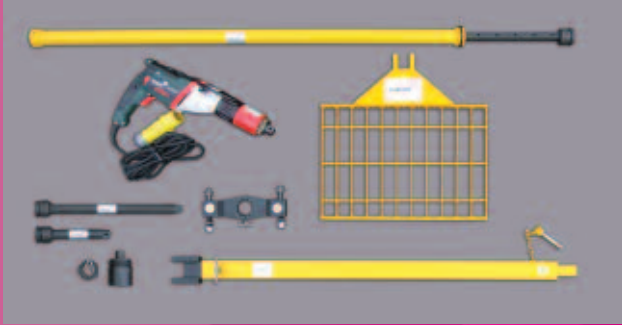


(B)



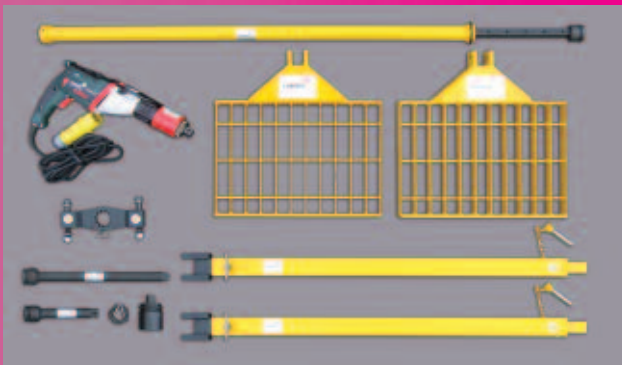
Kit 1 Single Sided System

- VC-RAD 6 Electric Torque Tool
- 1 x Reaction Plate & Telescopic Reaction Arm
- Double Reaction Block
- Telescopic Extension Bar
- Socket to suit valve
- 1 x 400 mm Extension Bar
- 1 x 200 mm Extension Bar
- Rings & Pins to suit Extension Bars



Kit 2 Double Sided System

- VC-RAD 6 Electric Torque Tool
- 2 x Reaction Plates & Telescopic Reaction Arms
- Double Reaction Block
- Telescopic Extension Bar
- Socket to suit valve
- 1 x 400 mm Extension Bar
- 1 x 200 mm Extension Bar
- Rings & Pins to suit Extension Bars



Benefits:

Safer and easier to use than conventional labour intensive methods

Speeds up the process of valve actuation

Heavy duty modular system is suitable for different valves and sites

Highly portable system can be used in remote locations

Controlled power delivery to help with the easing-off of valves

VC-RAD 6 Electric Torque Multiplier can be used for additional bolting & valve work

A VC-RAD Electric Torque Tool with additional special reaction, can also be used to operate high pressure valves



Call us to arrange a survey of your site

...call **01709 550088**



Optional Storage Box available

CHRISTIE
TOTAL TORQUE SOLUTIONS



“Why use a Christie Nose Extension?”

W. Christie Nose Extensions

W. Christie Nose Extensions are suitable for tightening and untightening threaded fasteners located within a deep recess.

A nose extension facilitates stable transmission of torque to the bolting application.

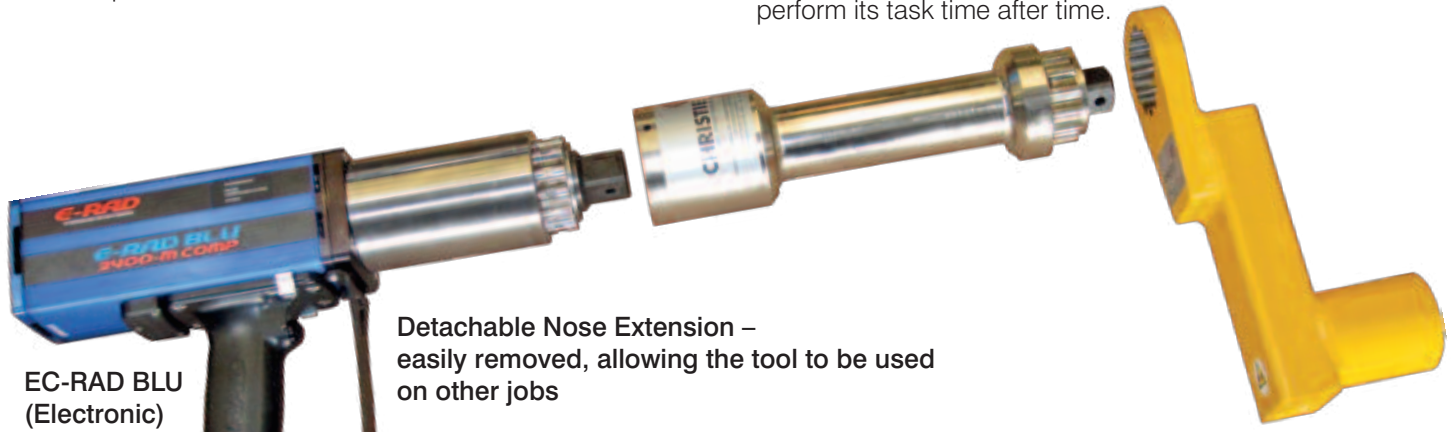
Provided that a direct line of access is available the nose extension will engage the application, whilst the tool is operated away from the obstruction.

The length & diameter of the nose extension depends on the restriction to be overcome, and the torque required.

A drive shaft supported by bearings ensures torque is transmitted safely, with virtually no mechanical losses.

Each nose extension is designed specifically for the application. Our engineers consider the customer requirements, model the site geometry, and design the nose extension using state of the art 3D software. Following a stress analysis the final drawings are prepared for manufacture.

Using the best quality alloys, the nose extension is manufactured in-house to high tolerances using the latest CNC technology. Testing is carried out above the design torques to ensure that the nose extension will perform its task time after time.

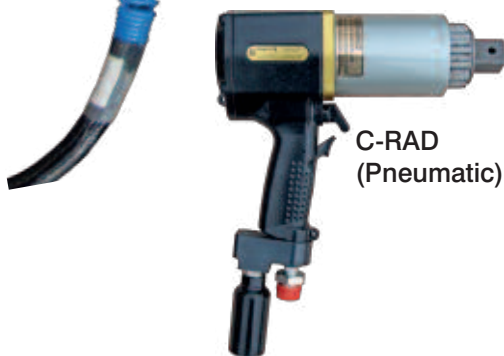


EC-RAD BLU
(Electronic)

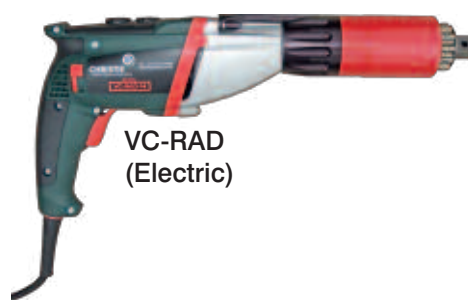
Detachable Nose Extension – easily removed, allowing the tool to be used on other jobs

Detachable Nose Extension

Detachable Nose Extension can be used with a range of W. Christie Torque Tools



C-RAD
(Pneumatic)



VC-RAD
(Electric)

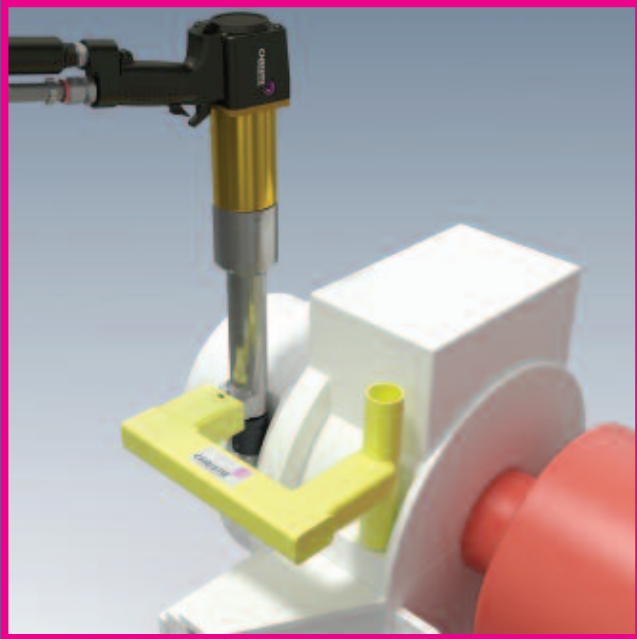


BC-RAD
(Battery)

Examples of access problems overcome with

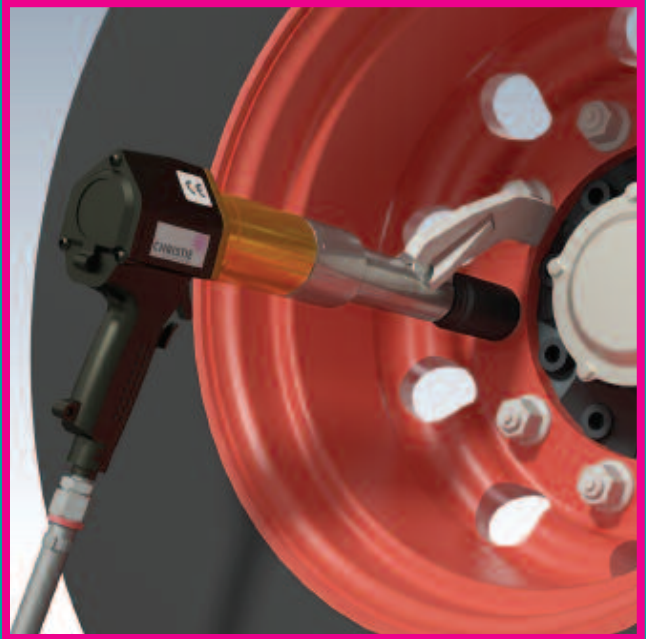
W. Christie Nose Extensions

W. Christie Nose Extensions



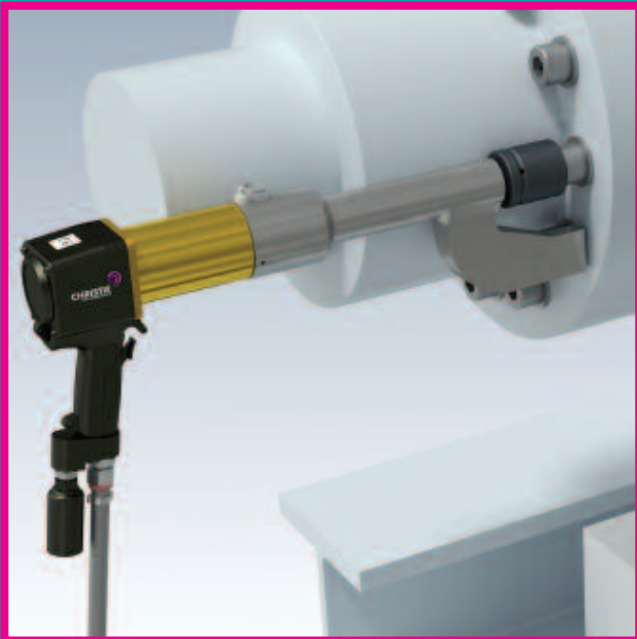
Generator

Bearings on a generator housing.
Length of nose extension: 210 mm



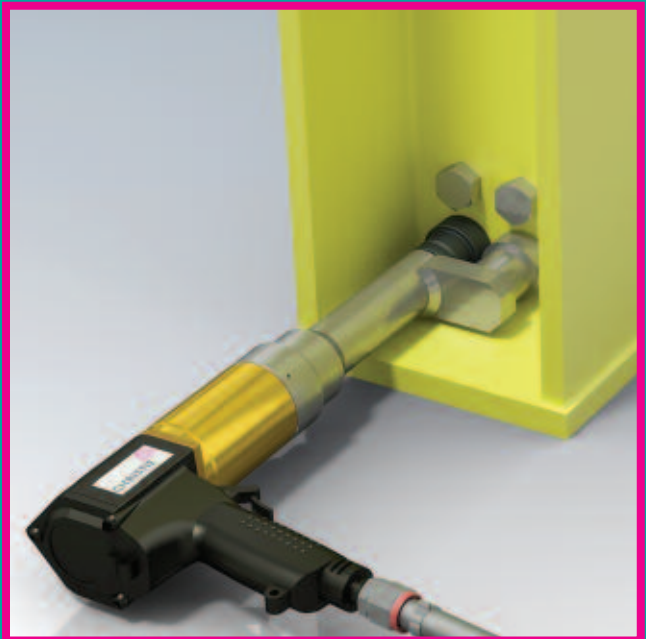
HGV Wheel

Tightening/untightening of wheel nuts.
Length of nose extension: 131 mm



Injection Moulding Machine

Bolts on a hydraulic cylinder flange.
Length of nose extension: 208 mm



Structural Steel Work

Tightening of bolts on structural steel.
Length of nose extension: 128 mm

W. Christie Lubro Control Units

the ideal choice for
the control of torque
in all your **pneumatic torque tools**

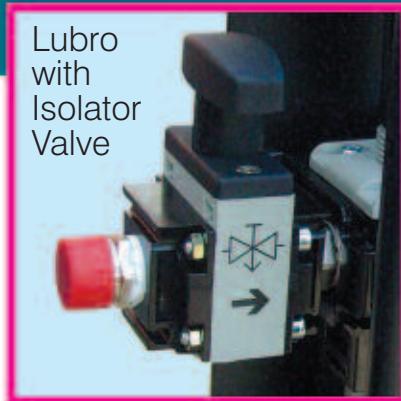
Installed between the air compressor and the torque tool, a Lubro Control Unit will not only allow adjustment of the air pressure for control of tool torque, it also lubricates the air supply.



Starts
prepares
Lubro



Pressure Lock-off Lubro



Lubro
with
Isolator
Valve



Carry Case
Lubro



Digital Pressure Gauge Lubro

Heavy Duty Water Filter Lubro

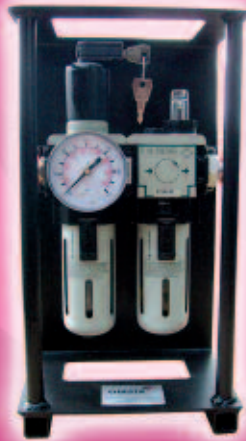


Other variations and features are available for both Standard Lubro and Heavy Duty Water Filter Lubro versions



Multiple Pressure Setting Lubro

Pressure Lock-off Lubro



Stainless Steel Lubro



Remote Lubro



Caged Lubro

We have a huge range of Lubro Control Units available for every operating condition

...call **01709 550088**



Multiple Pressure Setting Lubro



CHRISTIE
TOTAL TORQUE SOLUTIONS

Test Systems

Calibration Fixtures/Benches

Test Systems: Calibration Fixtures/Benches

Designed to simulate the working conditions of screwed or bolted joints, W. Christie Calibration Fixtures are used for testing and calibration of non-impacting power tools. These are available as stand-alone units or can be incorporated into a calibration bench designed to specific customer requirements.



Rundown Table with Torque Transducer capable of up to 5,000 Nm

1,000 Nm Hand Tool Torque Analyser

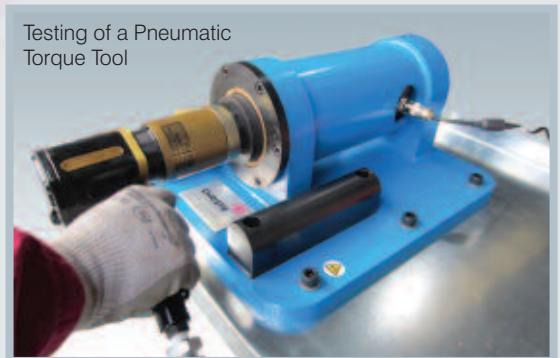
Calibration Management Readout



2,000 Nm Calibration Fixture



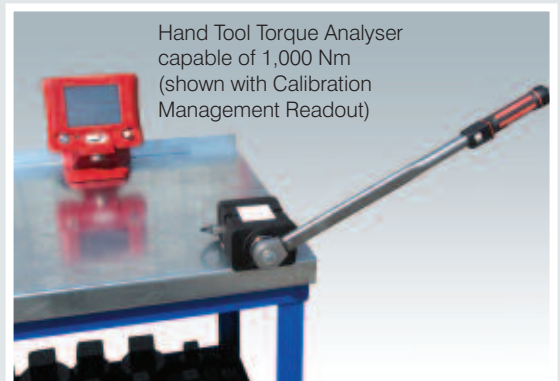
Testing of a Hydraulic Torque Tool



Testing of a Pneumatic Torque Tool



Torque Transducer with adjustable reaction point



Hand Tool Torque Analyser capable of 1,000 Nm (shown with Calibration Management Readout)



Calibration Bench with Torque Transducer capable of up to 33,900 Nm and adjustable reaction point

Valve Testing Systems

Custom built systems for measuring the torque and angle of a valve during the continuous opening/closing routine. This cyclical testing is a way of determining whether the design and build of a valve is up to the demanding environments in which it operates.

PC based system



Touch Screen Control Cabinet

Live graph tracks peak torque

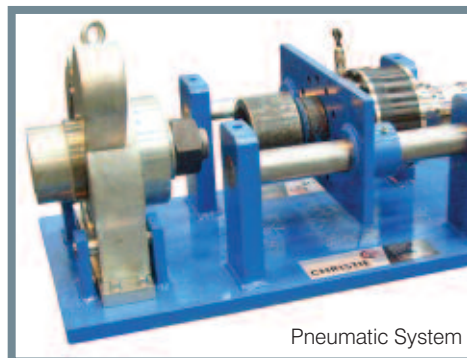


Test Systems: Valve Testing Systems

Bolt Analysing Systems

Available in both pneumatic and servo electric versions.

The electric system, with fully integrated load cell, gives the highest level of accuracy with logging of torque, load, angle and time data. These systems can be designed and built for a range of bolt sizes and torque values in order to suit individual customer requirements.



Pneumatic System



Electric Servo System

W. Christie offer a bolt analysing service (see page 54 for further information).

Hand Tools & Attachments

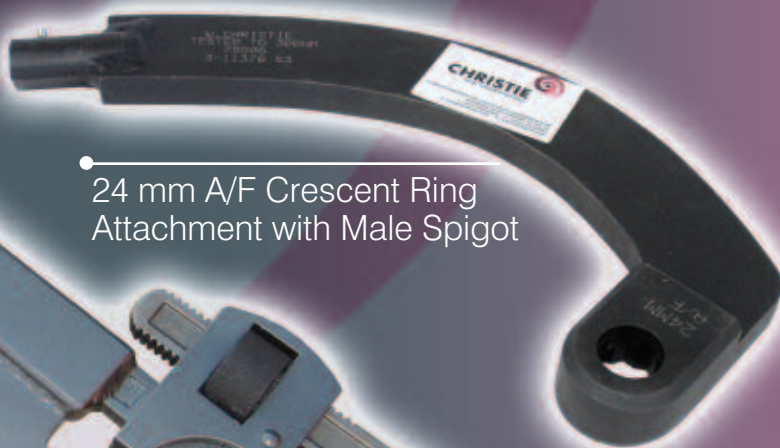
Not all jobs require the most sophisticated of tooling. Sometimes a hand tool with the appropriate configuration will be perfectly suitable.

W. Christie has extensive experience of manufacturing bespoke hand tools to meet the specific requirements of a particular application.

A small representative sample of such tooling is shown on these pages.



17 mm A/F Ring Attachment with Female Spigot



24 mm A/F Crescent Ring Attachment with Male Spigot

Stilson Torque Wrench with 63 mm adjustable head

25 mm A/F - 45° Cranked Ring Attachment with Extension Bar



24 mm A/F Open Offset Wrench Attachment with Square Socket




1.3/8" A/F Wrench Attachment with Female Spigot



24 mm A/F - 90°
Cranked Ring
Attachment with
Female Spigot



24 mm A/F Pipe
Union Wrench with
Square Socket



'C' Shaped Hook Wrench
with detachable handle –
Size range illustrated; Radius
141 – 334 mm and Overall
Length 630 – 2,324 mm



36 mm A/F Twin
Open Ended Wrench
with Extension Bar



46 mm A/F Wrench
Attachment with
Extension Bar



16 mm A/F
Crescent Ring
Attachment with
Female Spigot



46 mm A/F Wrench
Attachment with
Female Spigot

**Other variations
of Hand Tools
are available**

...call **01709 550088**



17 mm
A/F Ring
Attachment

CHRISTIE
TOTAL TORQUE SOLUTIONS



“Torque reaction tooling is only as good as the reactions themselves!”

Tool breakages are mostly caused by bad or unstable reactions.

A bespoke reaction will help prevent damage to the application and the tool. A tailored reaction is more stable, gives more accurate torque tightening, and will be safer to operate.

W. Christie can design and manufacture tooling 'reactions' for your specific bolting application.

This can either:

- Fit your existing tooling
- Fit the most appropriate type of tooling, selected from our wide range

Pressure Vessel Hand Wheel

CASE STUDY: Pressure Vessel Hand Wheel

Application:

Activating the hand wheel on a pressure vessel used in drinks manufacturing.

Problem:

When the vessel is under pressure, the forces acting on the lead screw of the vessel increase. This makes the hand wheel impossible to turn manually.



Solution:

A BC-RAD 10X (1,000 Nm) battery torque tool with 4 post socket and post reaction.



Gas Compressor Station Valves

Application:

Actuating various valves within a gas compressor station.

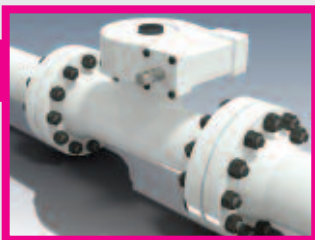
Problem:

When in service the valves are exposed to the elements, which can result in them becoming seized.

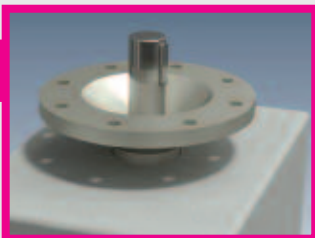
This means the torque required to activate the valves is too high to be carried out with a hand tool or valve wheel.

There is also a maintenance need to ensure the valves are free running.

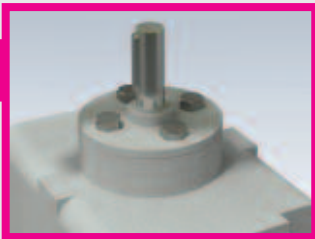
A



B

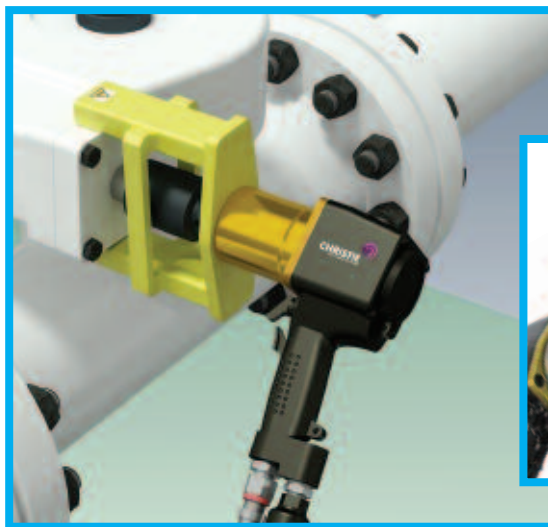


C



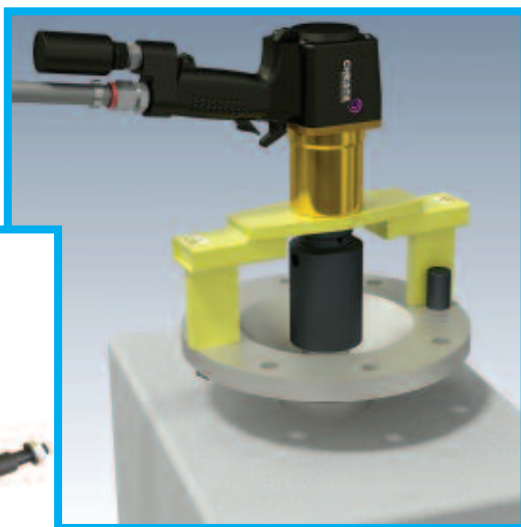
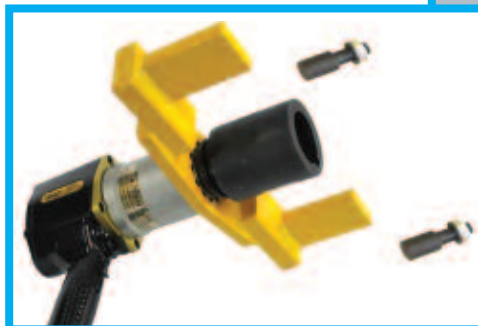
Solution A:

C-RAD 10L (950 Nm) Pneumatic Torque Tool with square to square socket and fork reaction.



Solution B:

C-RAD 10L (950 Nm) Pneumatic Torque Tool with double flag reaction and keyway socket to suit the male shaft.



Solution C:

C-RAD 10L (950 Nm) Pneumatic Torque Tool with tube - double fork reaction.



Blowout Preventer (BOP)

CASE STUDY: Blowout Preventer (BOP)

Application:

Tightening/untightening hexagon head bolts or socket cap heads on a Blowout Preventer (BOP).

Problem:

The bolts are equally spaced around the cylindrical structure meaning a lack of reaction points.



Solution:

C-RAD 27 (2,700 Nm) Pneumatic Torque Tool, double winged slotted and sliding slave reaction. These systems are available to suit most BOP couplers.



Flange within Manufacturing Plant

CASE STUDY: Flange within Manufacturing Plant

Application:

Cleaning and repairing male threads on flange studs

Problem:

Damaged and rusty studs need chasing down in order to clean and repair the threads without removing the flange.



Die Nut

Solution:

C-RAD 14 (1,350 Nm) Pneumatic Torque Tool, die nut socket to suit, and double tube reaction with Nylon sleeves to prevent thread damage.



Die Nut Socket

Railway Switch Track Equipment

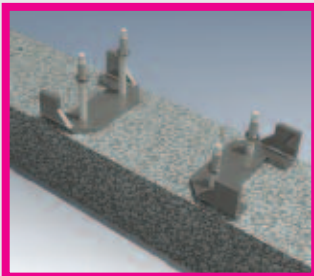
Application:

Fitting a metal plate to concrete sleepers, with self-cutting studs, which fit into a plastic insert.

Problem:

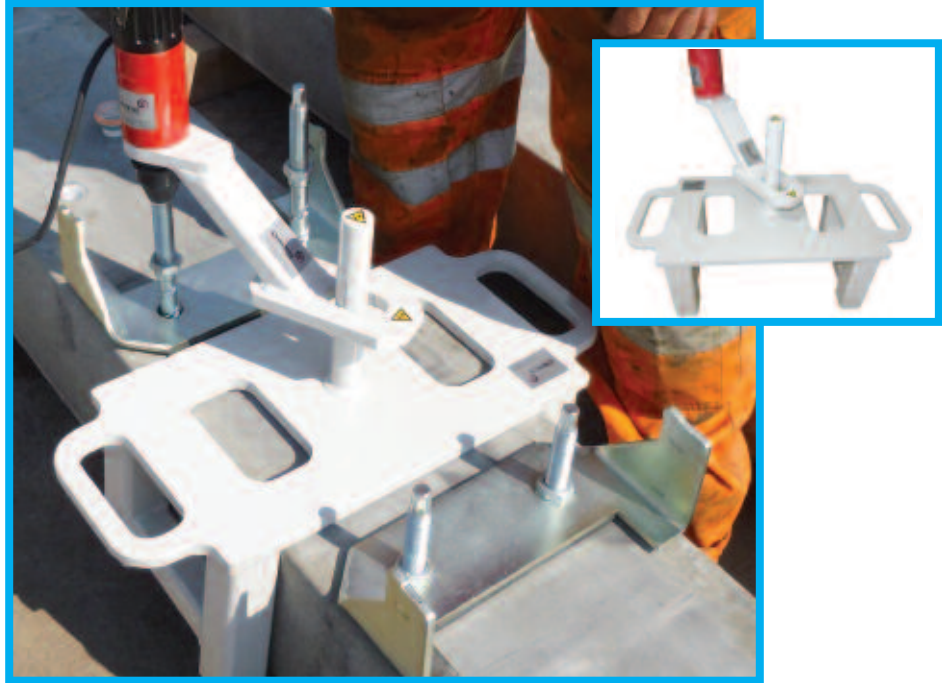
A slow ergonomically challenging process.

It is difficult to align the studs and achieve high torque with a manual method.



Solution:

VC-RAD 14 (1,350 Nm) Electric Torque Tool with Cranked Slotted Reaction and Reaction Platform dramatically speeds up the process, and is ergonomically sound for the user.



CASE STUDY: Railway Switch Track Equipment

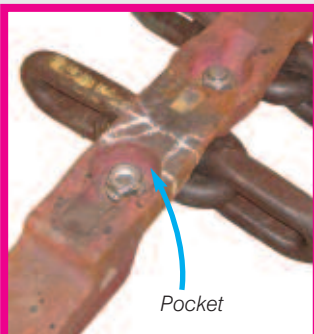
Scraper/Flight Bar Assemblies

Application:

Removal and refitting of Scraper/Flight Bar bolts secured with lock nuts.

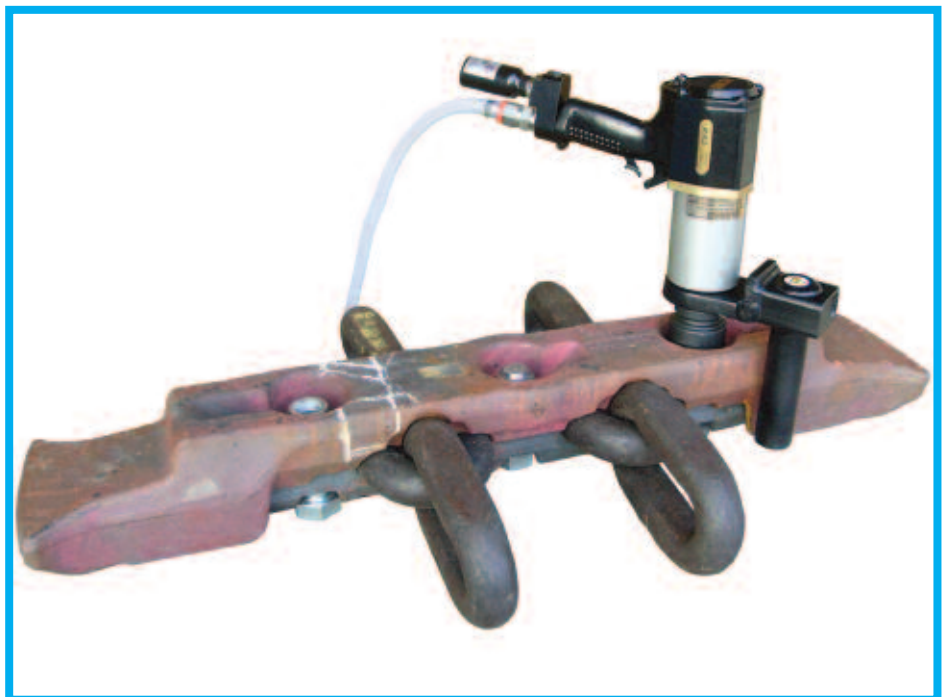
Problem:

Scraper/flight bar fixings become loose, damaged, and need replacing. The bolts are hard to access as they are located in a pocket.



Solution:

C-RAD 34 (3,400 Nm) Pneumatic Torque Wrench with bespoke 'post' reaction and tapered socket to suit the pocket.



CASE STUDY: Scraper/Flight Bar Assemblies

Flange with two diameters of Tie Bars

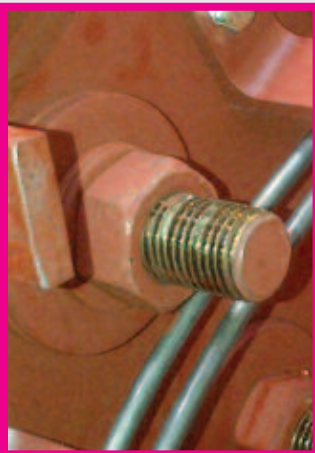
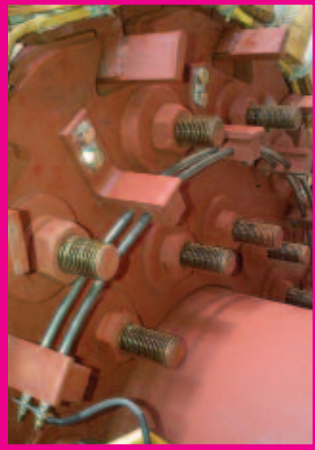
CASE STUDY: Flange with two diameters of Tie Bars

Application:

Tightening/untightening of inner and outer diameter of tie bars on a rotor.

Problem:

Difficult access and lack of reaction points.



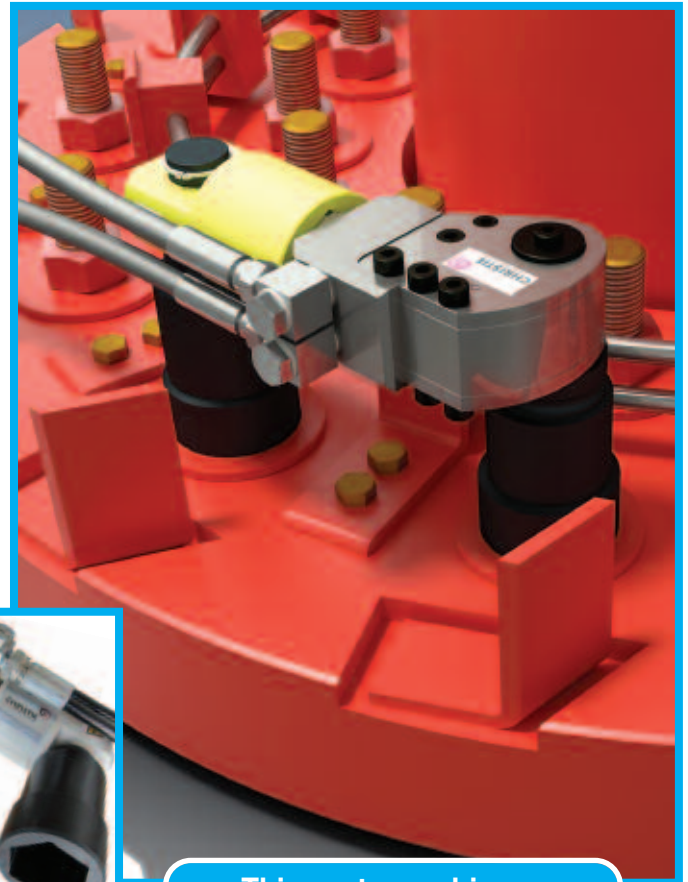
Solution:

CR 1.5 (2,040 Nm)
Hydraulic Torque
Tool used with:

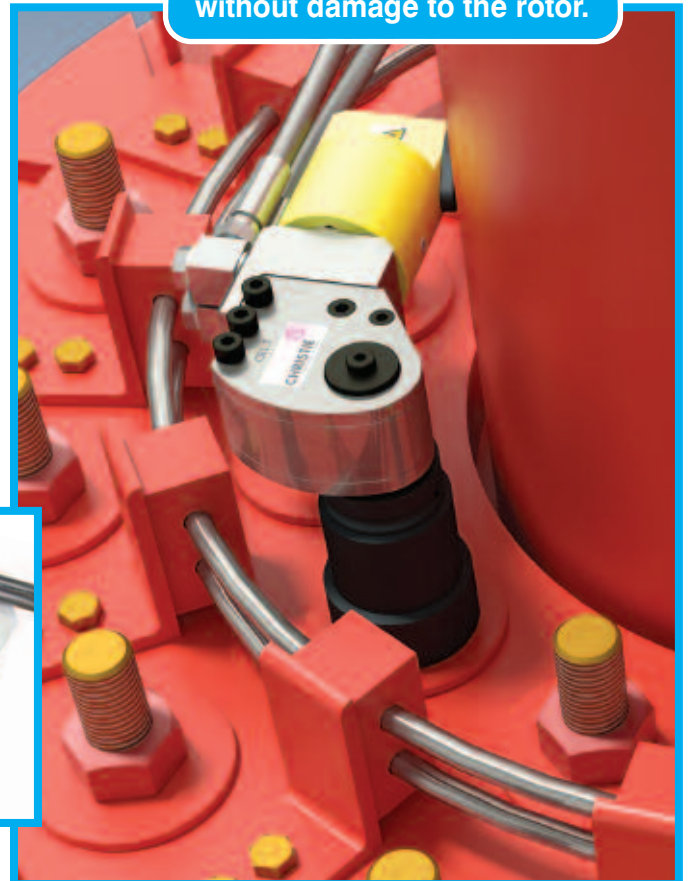
1. 'Tube' reaction with socket which reacts over the adjacent nut for tightening/untightening of the outer diameter of tie bars (46 mm A/F).



2. 'Straight' reaction with Nylon pad for tightening/untightening of the inner diameter of tie bars (46 mm A/F). This reacts against the central shaft of the rotor.



This system achieves tightening/untightening without damage to the rotor.



Pressure Vessel

Application:

Removal of a nut on a pressure vessel (gas cylinder).

Problem:

No suitable reaction point within the end plate of the pressure vessel.



Solution:

C-RAD 34 (3,400 Nm) Pneumatic Torque Tool with a double fork reaction to locate on the webs of the end plate.



CASE STUDY: Pressure Vessel

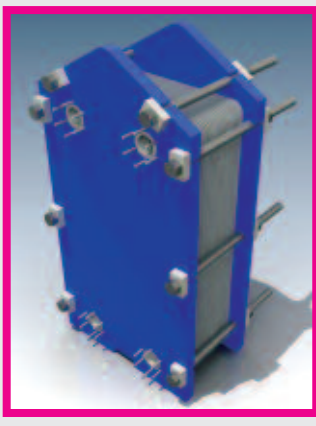
Plate Heat Exchangers

Application:

Releasing and tightening of tie bars on plate heat exchangers.

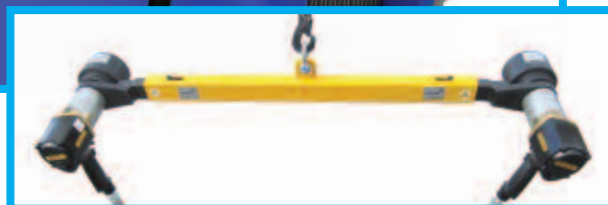
Problem:

To simultaneously release/tighten a pair of tie bars, with captive nuts.



Solution:

Two C-RAD 27 (2,700 Nm) Pneumatic Torque Wrenches with adjustable, double sliding reaction and special sockets.



CASE STUDY: Plate Heat Exchangers

Digger Bucket

CASE STUDY: Digger Bucket

Application:
Replacement of wear plates
on digger bucket.

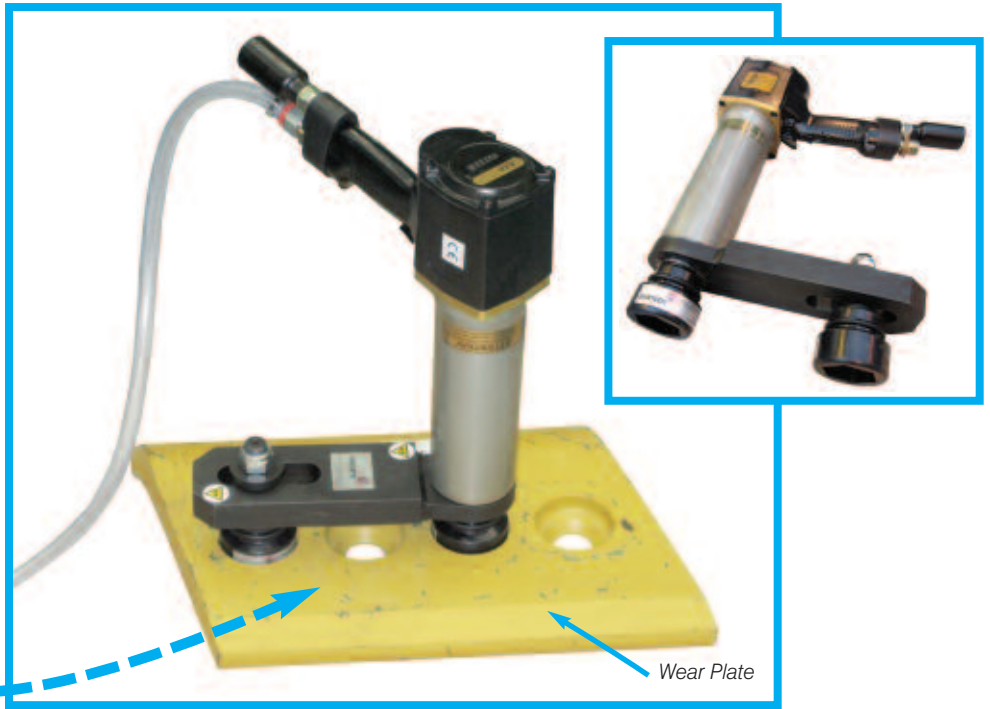
Problem:

No suitable reaction point.



Solution:

C-RAD 40 (4,000 Nm) Pneumatic Torque Tool with sliding slave reaction and special low profile sockets.



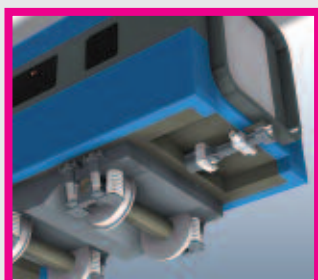
Train Auto-coupler

CASE STUDY: Train Auto-coupler

Application:
Tightening & Untightening
bolts on auto-coupler
mounting plate on trains.

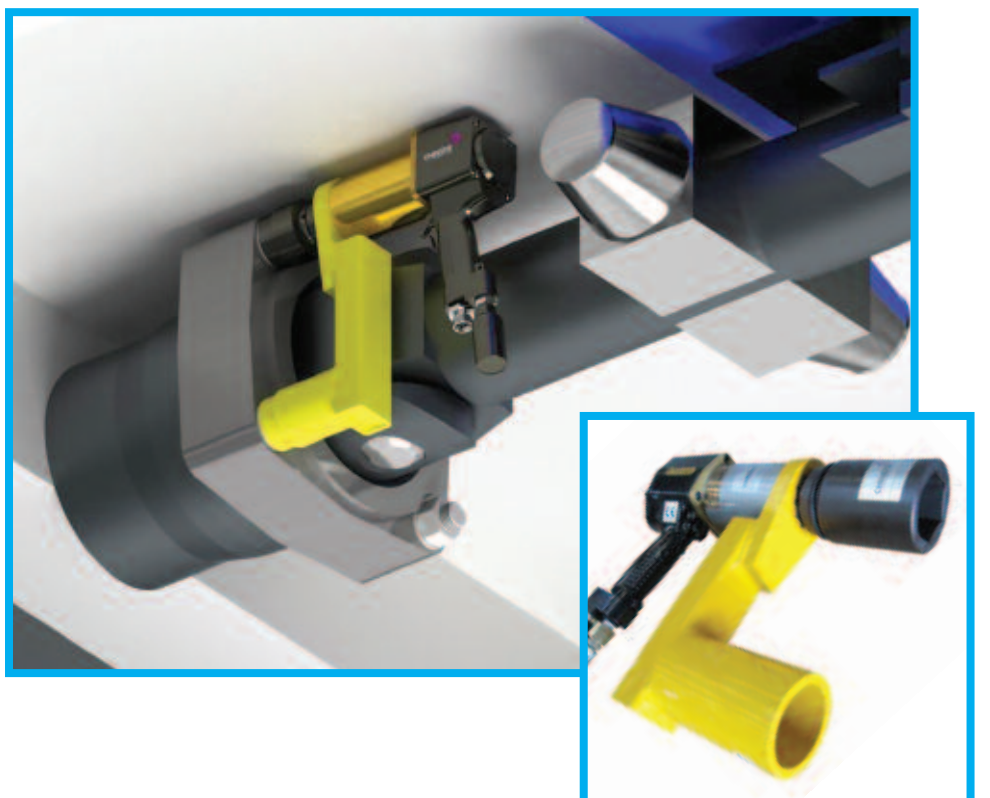
Problem:

Accessing difficult to reach bolts on auto-coupler mounting plate and the need to prevent damage to areas of the auto-coupler during bolting process. Traceability of torque data is also increasingly required.



Solution:

C-RAD 34 (3,400 Nm) Pneumatic or EC-RAD 3400 (3,400 Nm) Electronic Torque Tool with straight reaction tube. The electronic tool option can provide data logging facility.

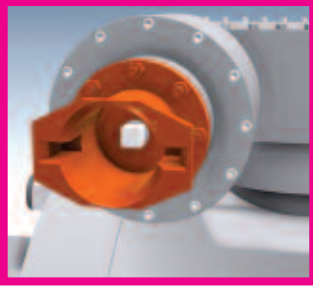


ROV Interface

Application:
Activating a valve via a ROV Interface.

Problem:

Rotating the square drive within the ROV Interface and ensuring a stable reaction.



Solution:

C-RAD Pneumatic Torque Tool with special ROV Interface double reaction and end effector. Solutions available to suit ISO 1-7 and API 1-7 ROV Interfaces.

Example shown:
C-RAD 27 (2,700 Nm) with ROV 4



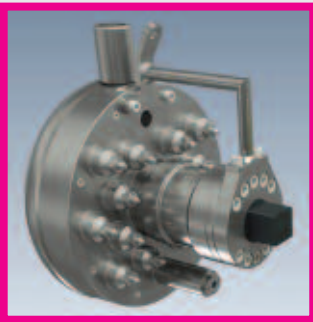
CASE STUDY: ROV Interface

Valve Spindle

Application:
Opening and closing a valve.

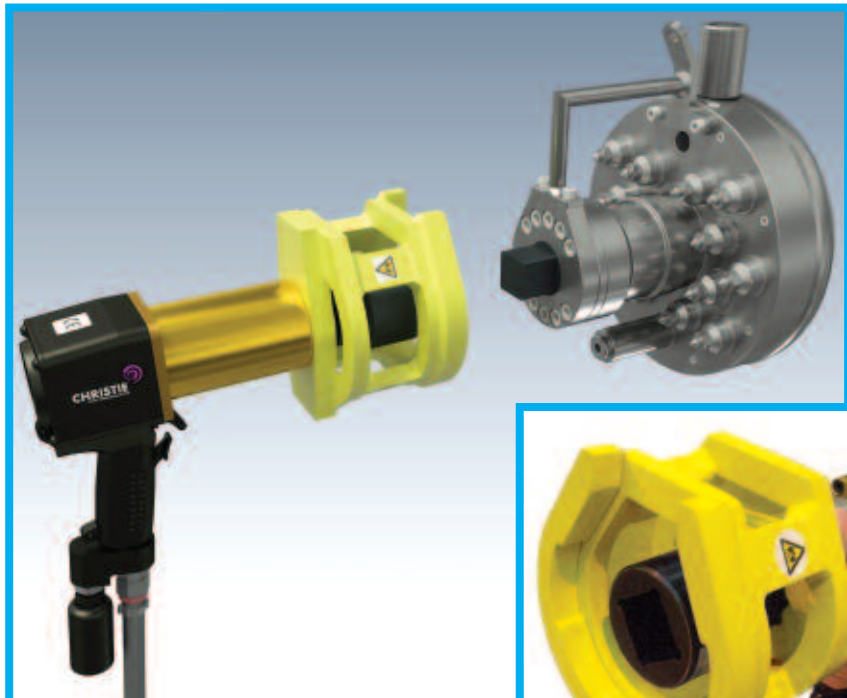
Problem:

Difficulty in finding a suitable reaction point for activating the valve spindle without damaging the casing.



Solution:

C-RAD 27 (2,700 Nm) fitted with special reaction, contoured to outer profile of valve unit to offer stable reaction.



CASE STUDY: Valve Spindle

Excavator Manufacturing

CASE STUDY: Excavator Manufacturing

Application:
Assembly of excavators.

Problem:

The need to carry out multiple bolting applications with the same tool, whilst avoiding paint damage.



Solution:

Reaction arms with quick-release mechanisms which allow the reaction arms to be easily changed, without the need to remove the universal interface from the torque tool.

Nylon pads protect the chassis from paint damage.

This system saves time and money.



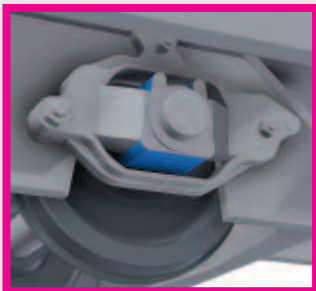
Underground Train Bogie Frame

CASE STUDY: Underground Train Bogie Frame

Application:
Tightening/untightening of bolts on an underground train bogie frame to allow height adjustment.

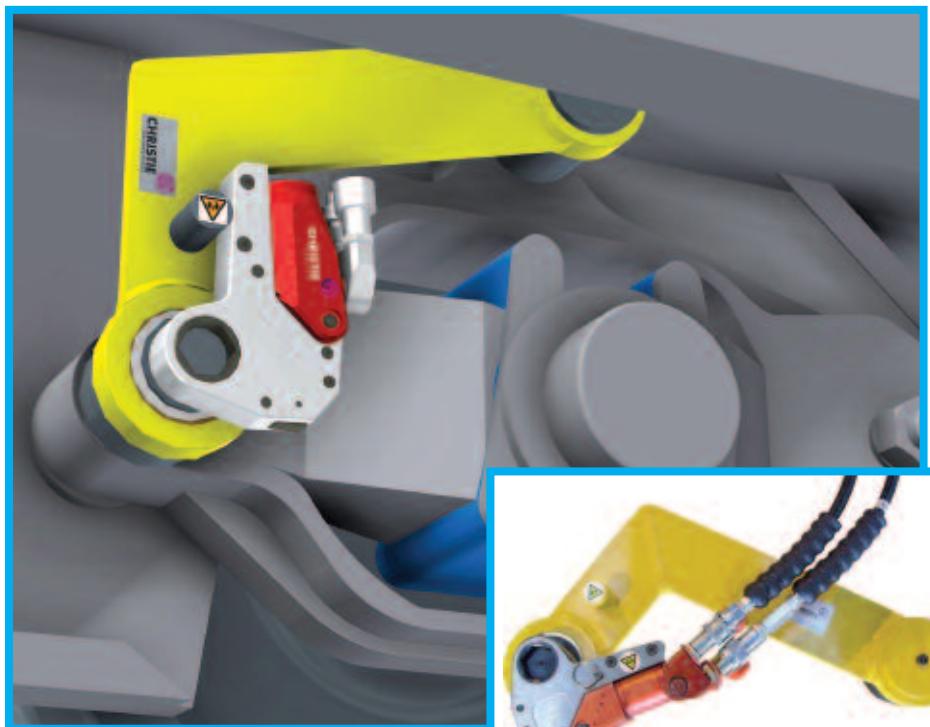
Problem:

Accessing the bolts on the bogie frame, with beam and sole bar obstructions, whilst avoiding damage to the Aluminium section.



Solution:

Direct fit hydraulic torque tool used with a cranked reaction platform which reacts on an opposing nut to the torque tool.



Bus Wheel

Application:

Rotating the wheels of a jacked-up bus at 42 rpm, for the purpose of testing on-board speed sensors.

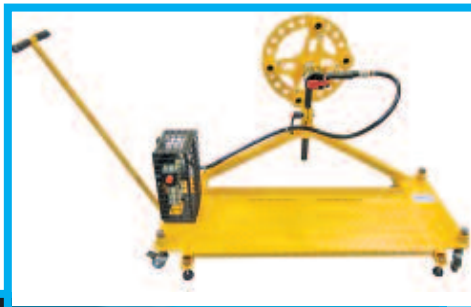
Problem:

The bus wheels are currently rotated by hand which is both labour intensive and difficult to achieve the required rpm.



Solution:

Pneumatically powered stand-on wheeled reaction system with dual safety trigger.



CASE STUDY: Bus Wheel

Boiler Feed Pump

Application:

To tighten and untighten 7.5/8" A/F octagonal nuts on a boiler feed pump flange in a power station.

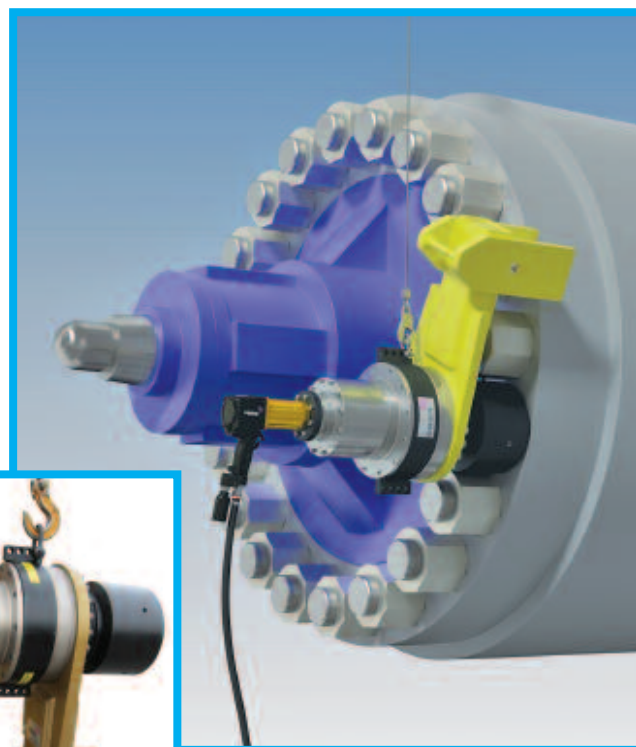
Problem:

Getting a suitable reaction point at 50,000 Nm, whilst overcoming the proximity of adjacent nuts.



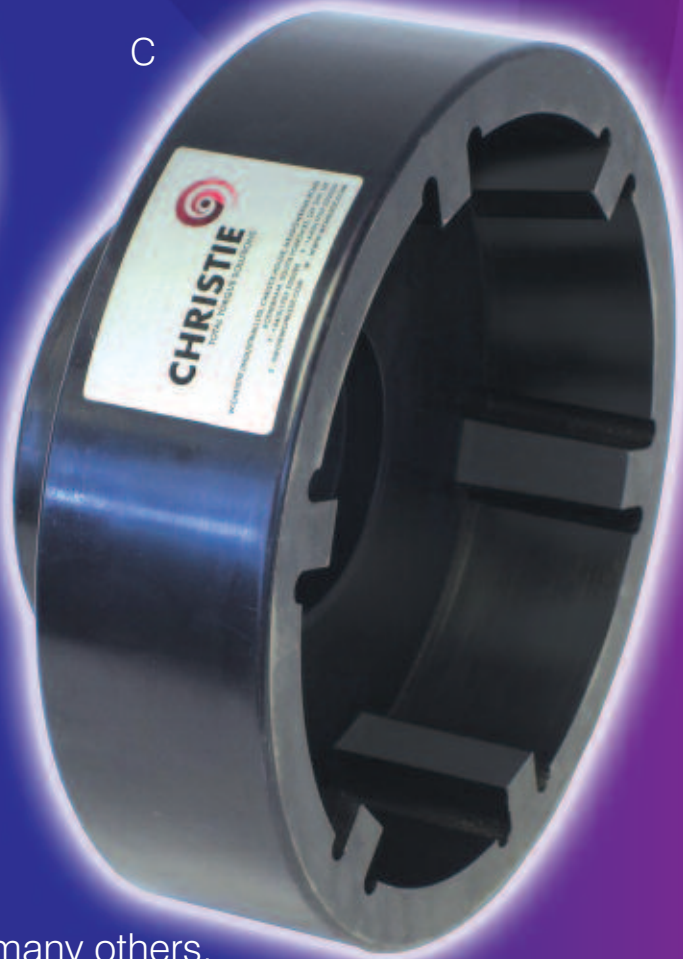
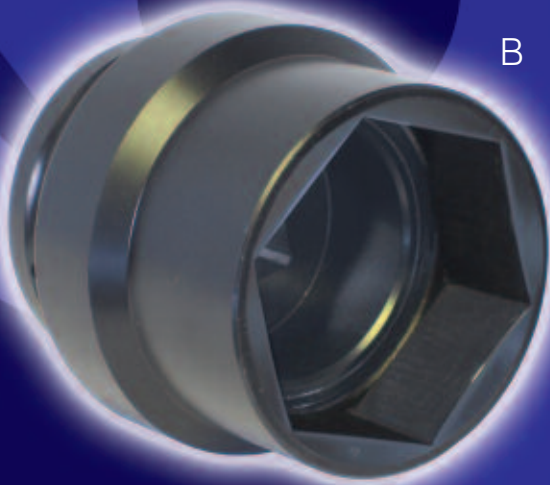
Solution:

A C-RAD (100,000 Nm) variant Pneumatic Torque Tool with spring balancer and flag reaction.



CASE STUDY: Boiler Feed Pump

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- G. Cut-away Female Hex. Socket
- H. Dirt Clearance Socket
- I. Offset Wrench
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- K. Eyebolt Socket
- L. Thin Wall Bi-Hex. Socket
- M. Keyed Socket
- N. Male Square Surface Drive Socket

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Stud Runner Sockets

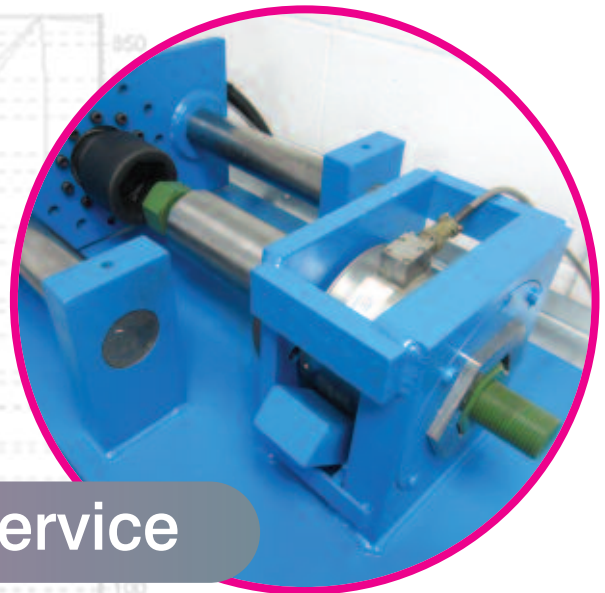
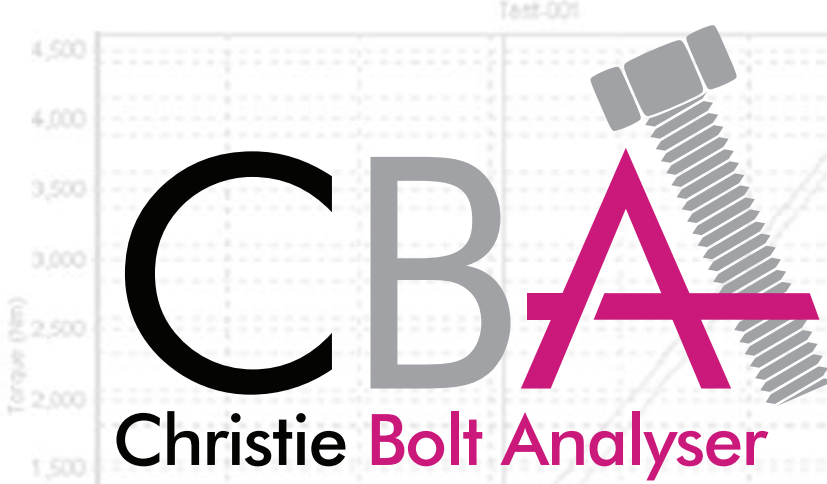
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W. Christie Bolt Analysing Service

Bolt Analysing Service

Have you got failing bolts or joint integrity issues?

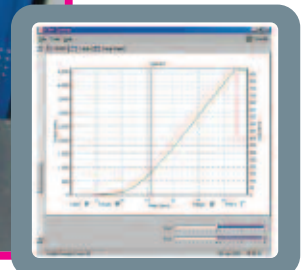
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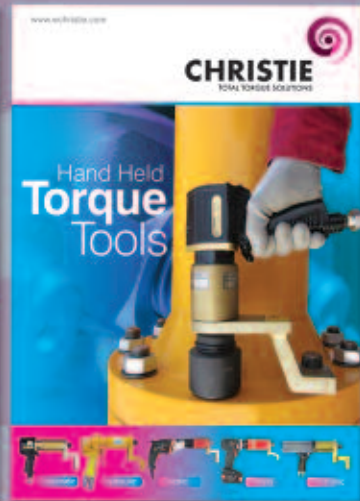
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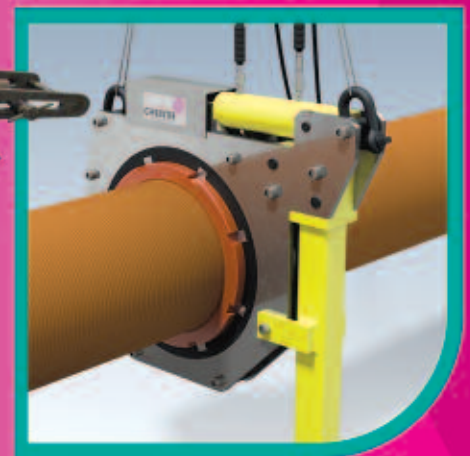
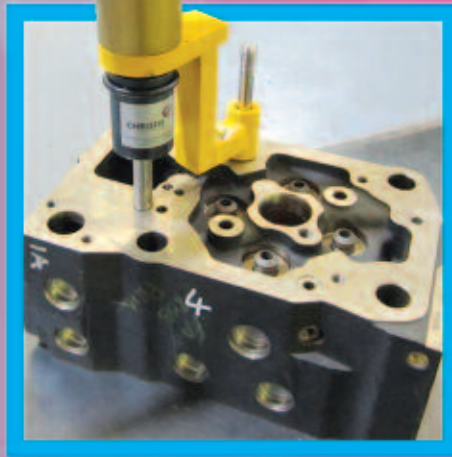
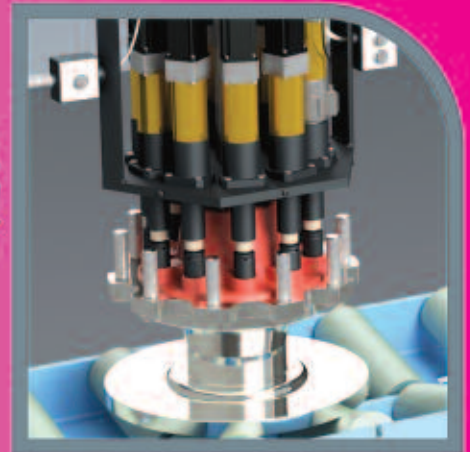
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