Introduction to Torque Tool & Safety Basics

Presented by Kerwyn Bornell

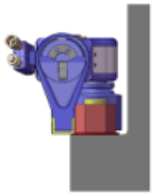
HYTORC

Bolting Institute

Topics

AVOIDING PINCH

SOCKET SAFETY

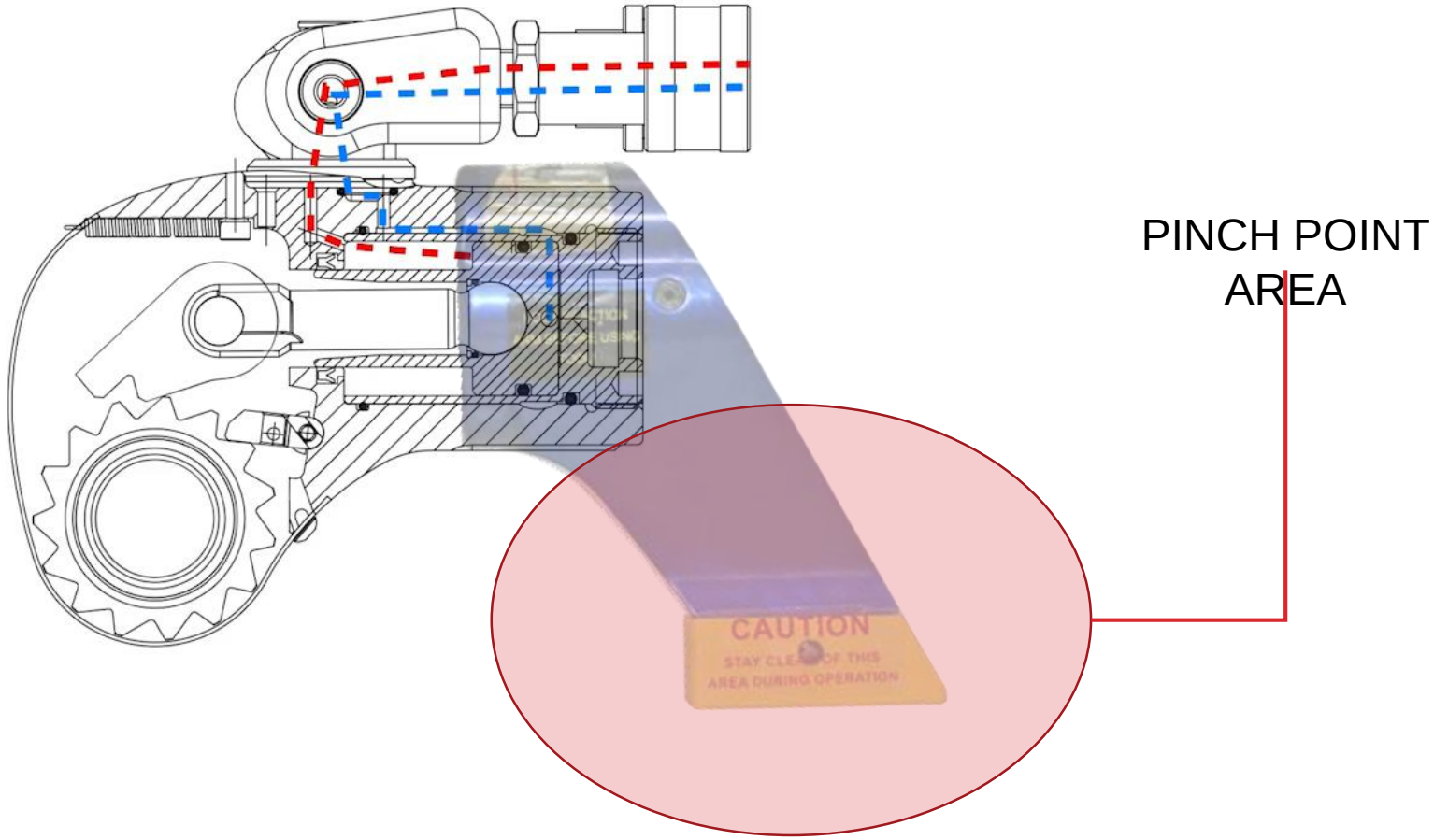


POSITIONING THE

HYDRAULIC PRESSURE

PERSONAL PROTECT

Avoiding Pinch Points



Avoiding Pinch Points

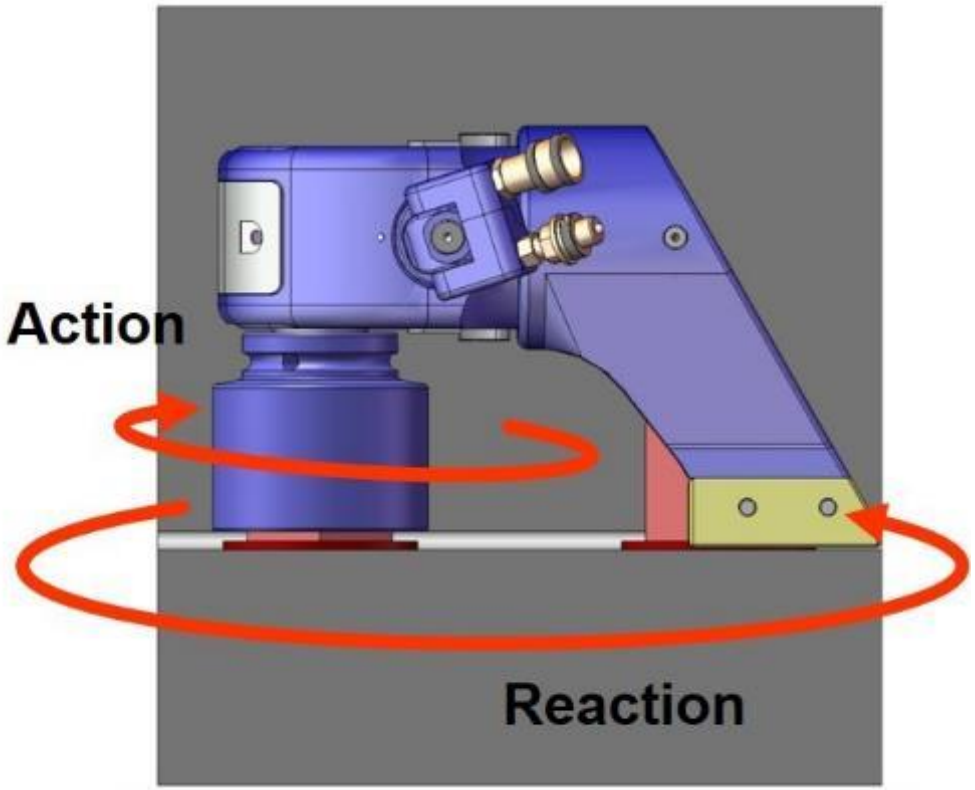
Reaction arm pinch hazard

A pinch point is created on the active front side between the he torque wrench reaction arm and the reaction surface. This pinch point is an area where technicians may get their hand caught during normal operations. This can be avoided but only with safety training and constant vigilance.

Backup wrench pinch hazard

A second pinch point is created on the passive rear side of the flange where the backup wrench is braced against a firm surface. This is a potential area where technicians can get their hands caught. This can be avoided but only with safety training and constant vigilance.

Avoiding Pinch Points

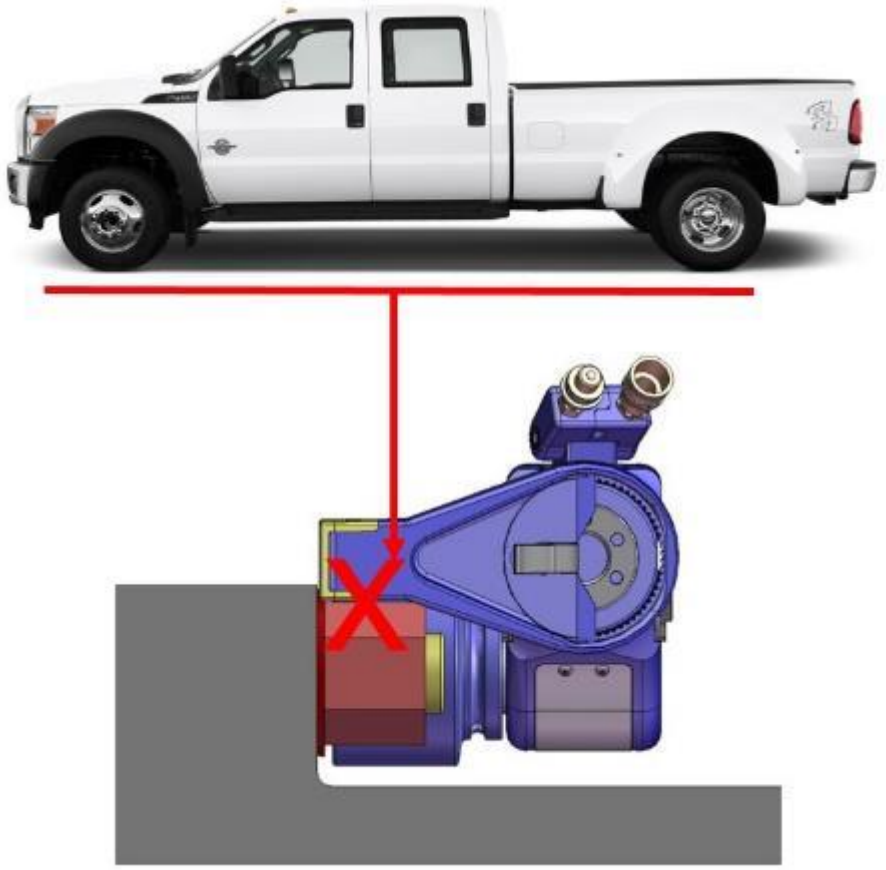


Action – Reaction

For every Tool Torque action driving a nut in one direction there is an equal opposition Torque called “Reaction” driving the tool body in the opposite direction.

Equivalent to a Truck

Looking at this from a different angle, this reaction force is just like parking the entire weight of your truck at a single point



Avoiding Pinch Points

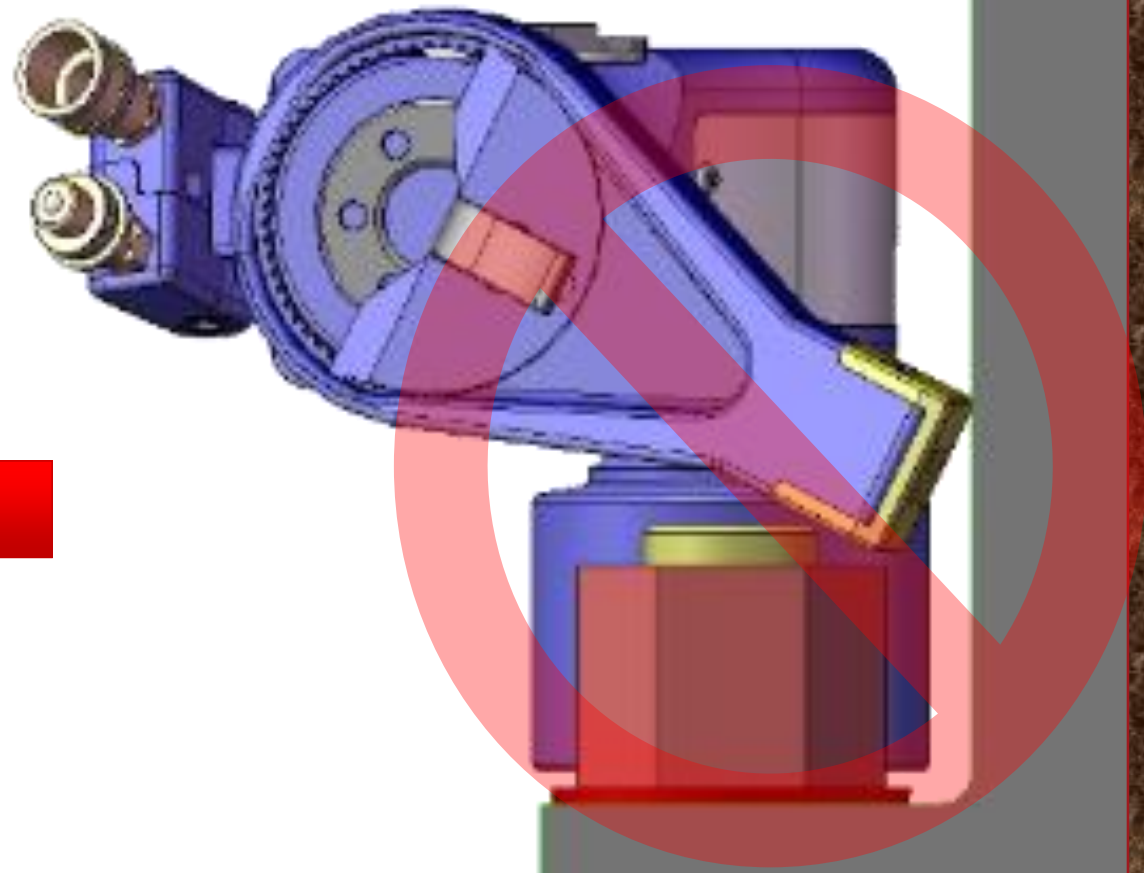
Avoiding Pinch Points

Using conventional torque tightening methods, the torque tool must be braced typically with reaction arm and the back nut must be braced with a backup wrench.

Is there a better way?

Given the high concentration of reaction forces involved with conventional torque bolt tightening - and the associated safety hazards and potential damage to equipment…is there a better way?

Positioning the Tool



Not Recommended

Indexing Reaction Arm

Never set the reaction arm to the bulkhead of the pipe. This can cause the tool to slip off of the application, this can also cause stress fractures to the pipe

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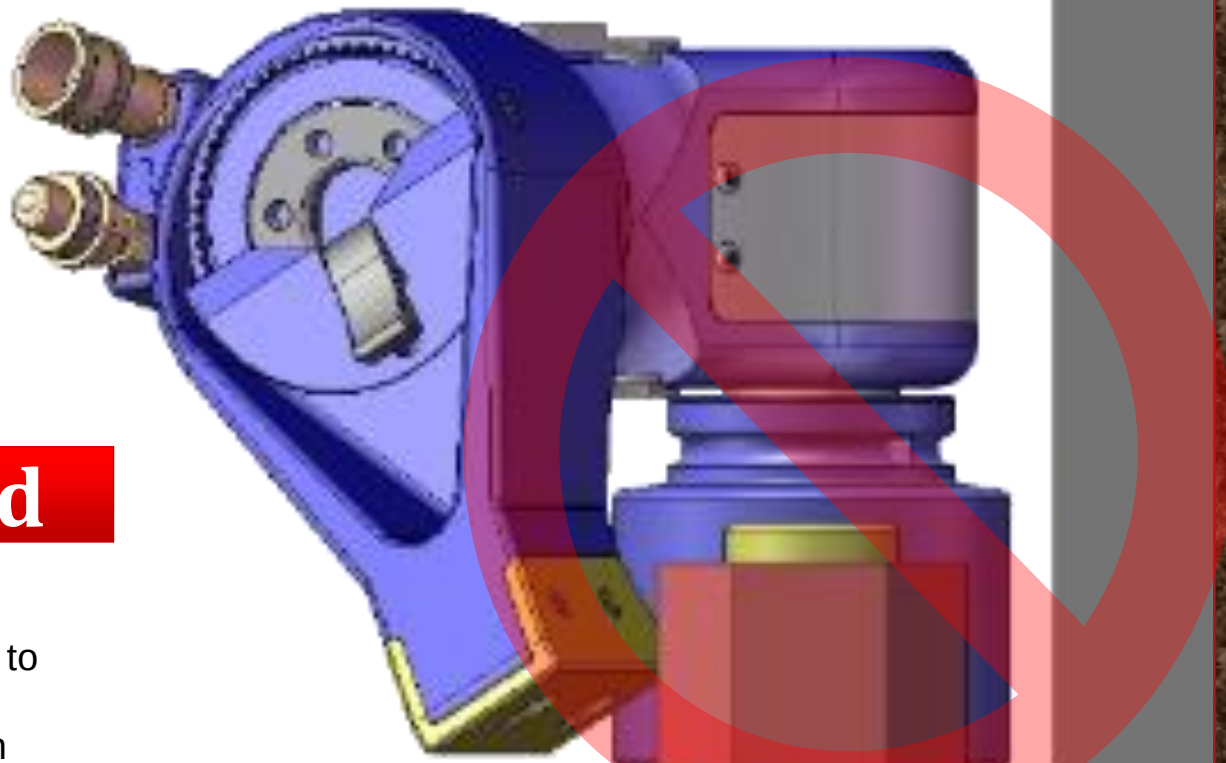
Positioning the Tool



Not Recommended

Indexing Reaction Arm

Never set the reaction arm at a wedge angle to the bulkhead of the pipe or even the nut. This can cause the tool to slip off of the application while working at these high pressure settings.

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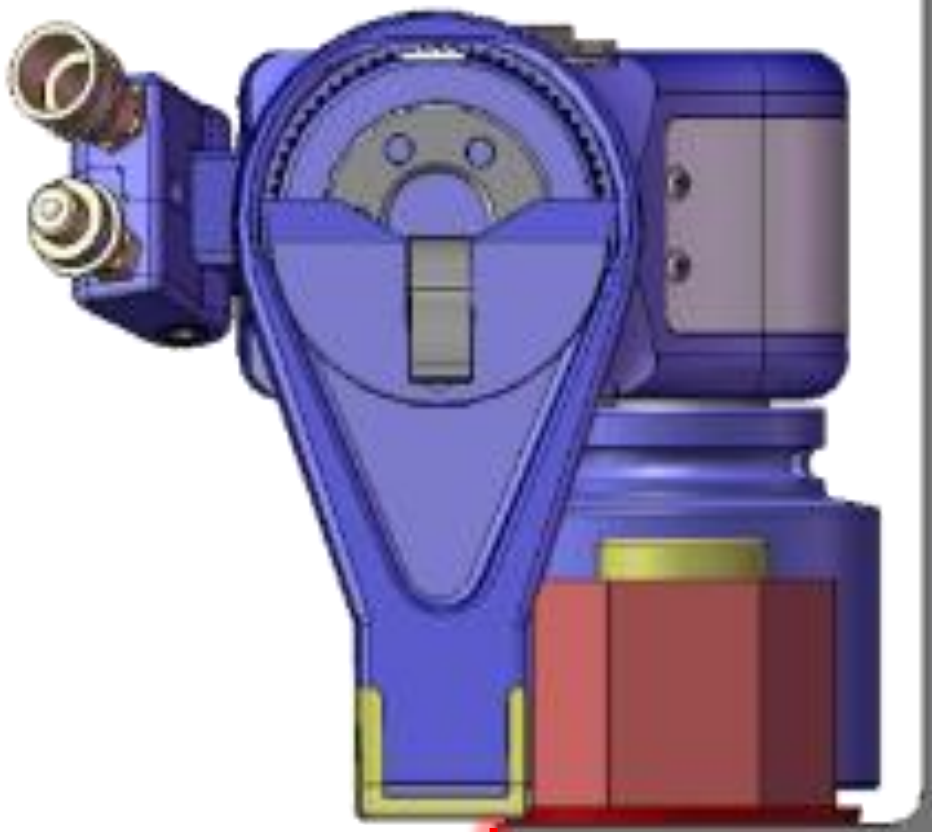
Positioning the Tool

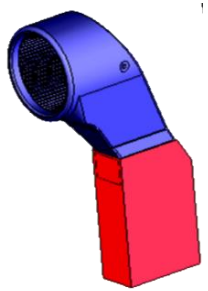
Recommended

Indexing the Reaction Arm

It is always good practice to set the reaction arm at a straight even plain with the nut.

Sometimes a longer reaction arm is needed to react off the side of the flange





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Positioning the Tool

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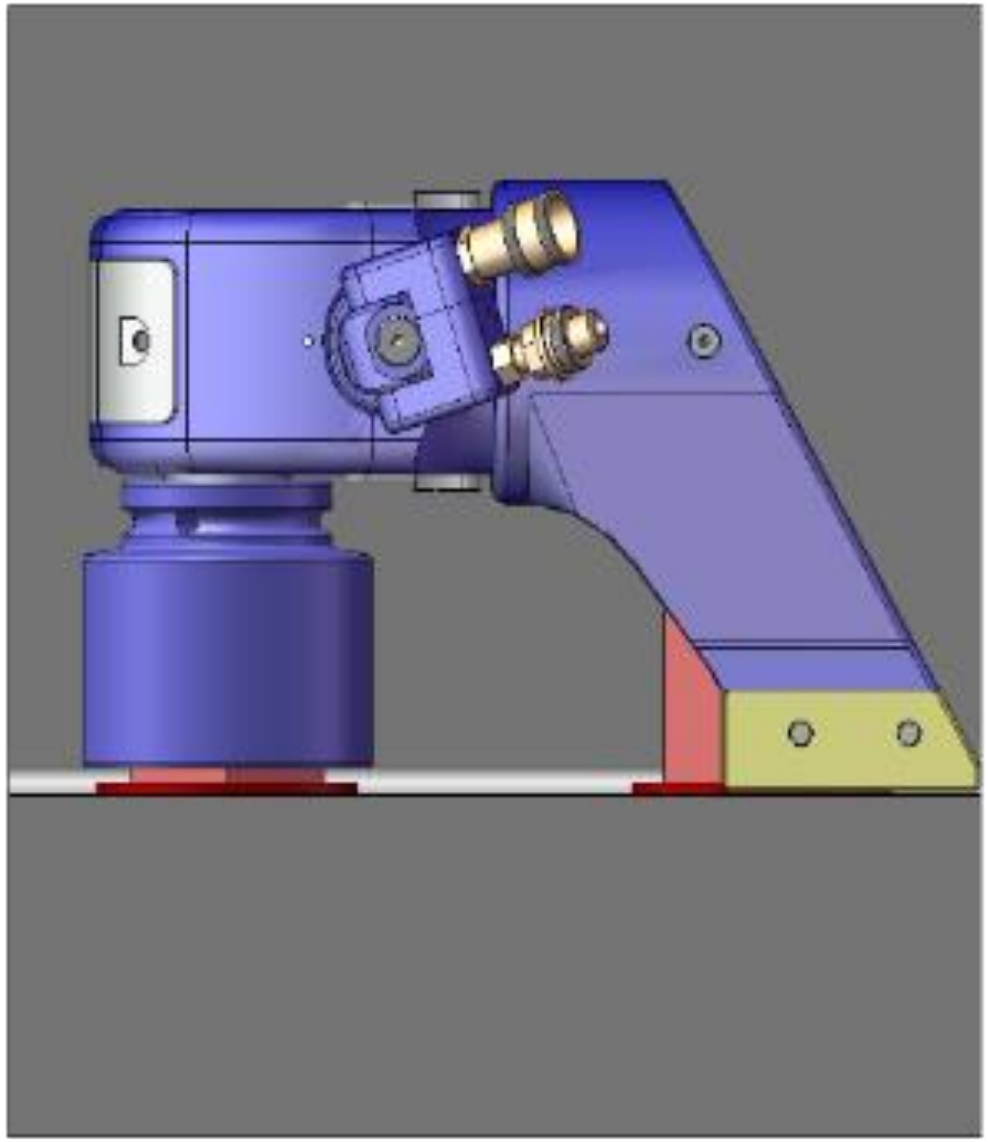
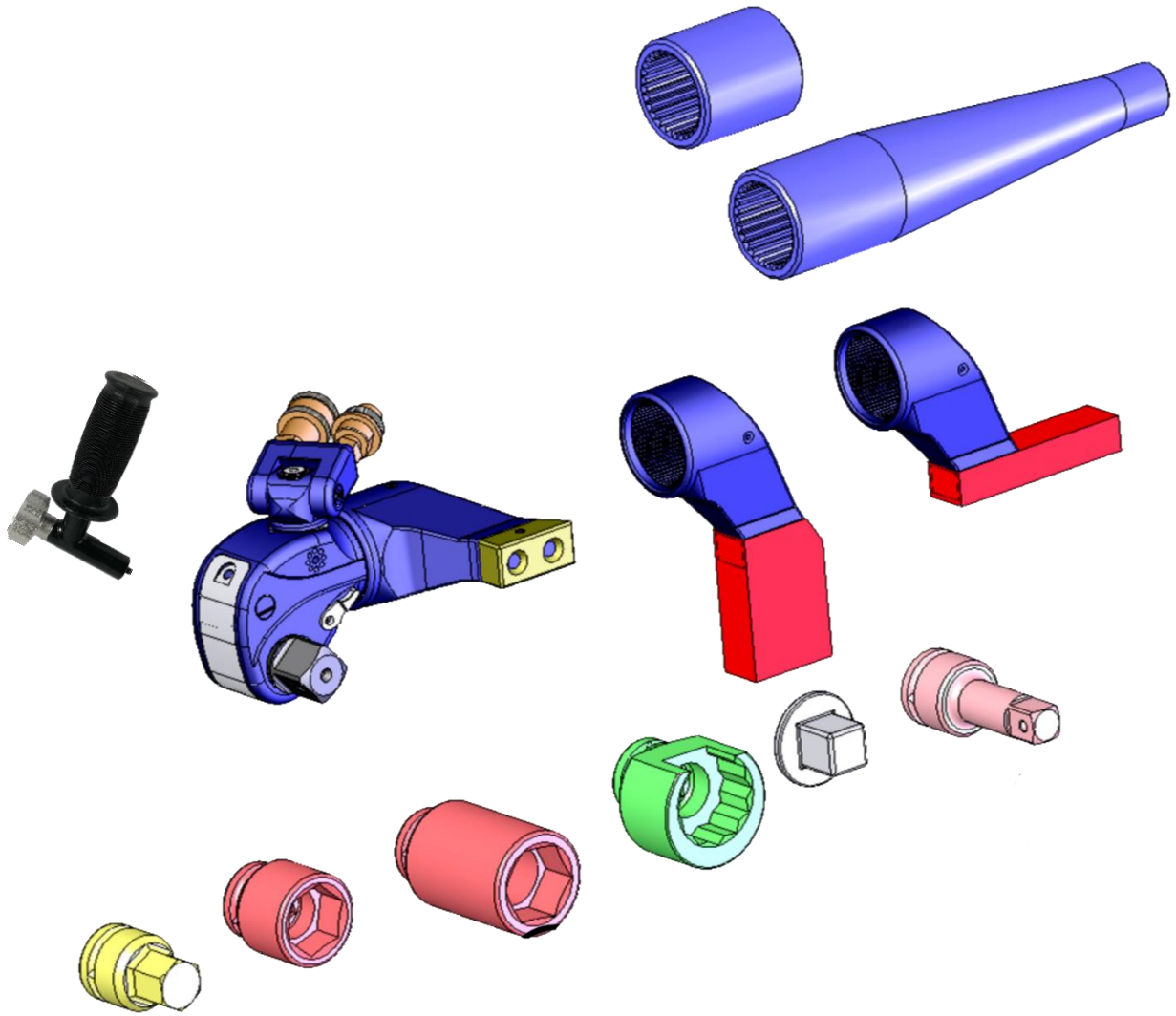


Positioning the Tool

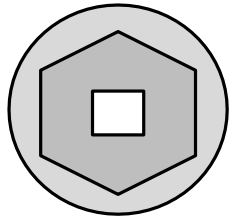


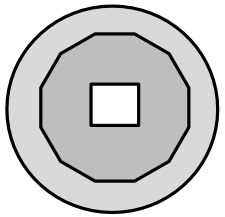
Socket Safety

Always use impact grade hex sockets sized correctly.

- **Always Use Premium Impact Grade Sockets**
  Bolting sockets are heavy duty made for torsion & shock, forged and heat tempered for toughness, have thicker walls, never plated

  Avoid light duty chrome plated consumer sockets which are brittle and prone to shatter, these are not designed for power tools





- **Always Use the Strongest Socket for the Job**
  Hex sockets have thicker and stronger walls, loads on flats
  12-point sockets have thinner walls, loads on points

- **Always Use the Correct Size and Material Socket**
  Sloppy or high loading on the socket can shatter the socket

- **Take Care with Extensions and Adapters**
  Never use universal joints in torque operations or other adapters that may not be strong enough to transfer the torque.

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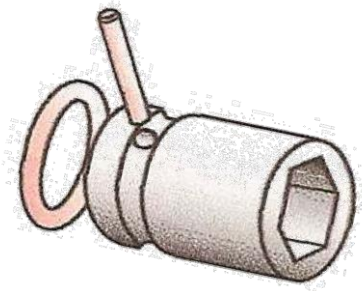
Socket Safety

- **Always Pin the Socket to the Drive**
  Make sure sockets are firmly attached to the drive,
- **Avoid Thin-Wall and Deep-Well Sockets**
  Never Use a Cut-Down or Modified Socket, the integrity of the metal forging is destroyed
- **Always Inspect Every Socket Before Use**
  Make sure there are no visible cracks, rounding or damage
- **Never Strike a Socket Under Load**
  The socket material can shatter and explode
- **Keep Clear of the Fracture Danger Zone**
  Especially during Final Stage of Tightening, or initial Breakout







Hydraulic Pressure Awareness

- **Communicate the Risk of High Pressure Injection**
  Train all operators on the potential dangers of high pressure injection.
- **Inspect all Components for Damage**
  Repair or replace any damaged components.
- **Make Sure Components Meet Specification**
  Hoses should be marked with proper pressure rating.
- **Check-ball fittings and Connectors**
  Ensure that hose connectors cannot come apart under pressure.
- **Avoid Exposure/Contact with Hydraulic Fluid**
  Wear oil resistant gloves & safety glasses to protect skin and eyes from irritation.
- **Inspect Tool Seals for Leaks or Damage**
  Repair or replace any damaged parts.

Hydraulic Pressure Awareness

Hydraulic Pumps generate up to 10,000 psi of hydraulic pressure, always take caution when handling pumps.

❑ Keep fan vents clean

Vents on the AC motor and on the oil cooler fan should be free of debris to prevent overheating/fire.

❑ Verify power control

Do not use a pump that cannot be powered on/off; this condition is dangerous and must be repaired.

❑ Power unit off for configuration changes

Disconnect the pump from the power supply before making any configuration changes or before storing the tool to reduce the risk of advertently powering on the pump or bolting tools.

❑ Trained Operators Only

Do not allow persons unfamiliar with these instructions to operate the Pump or Hydraulic bolting tools.

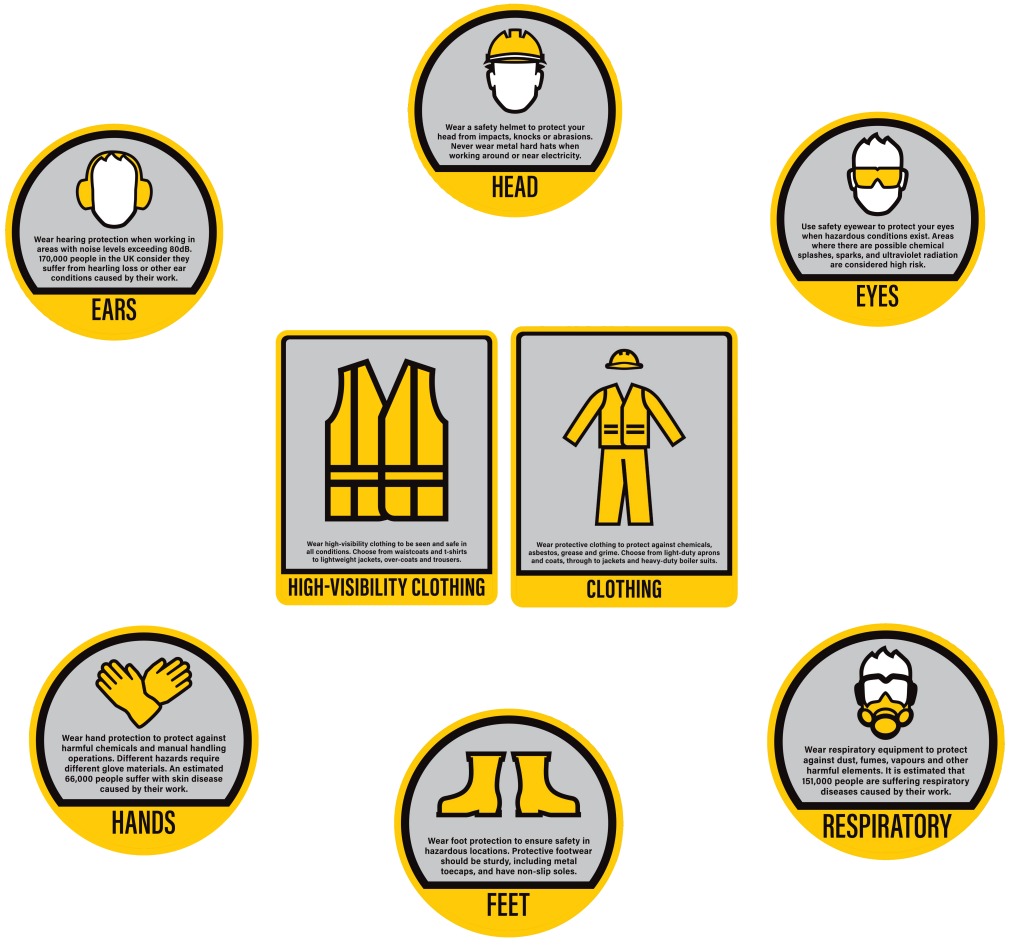
❑ Maintain pump components

Check for breakage of parts and any other condition that may affect the pumps operation. Have damaged parts repaired before use.

Hydraulic Pressure Awareness

- **Hydraulic bolting**
  Hydraulic bolting can be done where flammable or even explosive gases or liquids could be present.
- **Air-Powered Pump**
  An air powered intrinsically safe pump should be used instead of one with an electric motor.
- **Non-Sparking**
  The air pump is totally non-sparking and does not pose an ignition risk.

Personal Protective Equipment



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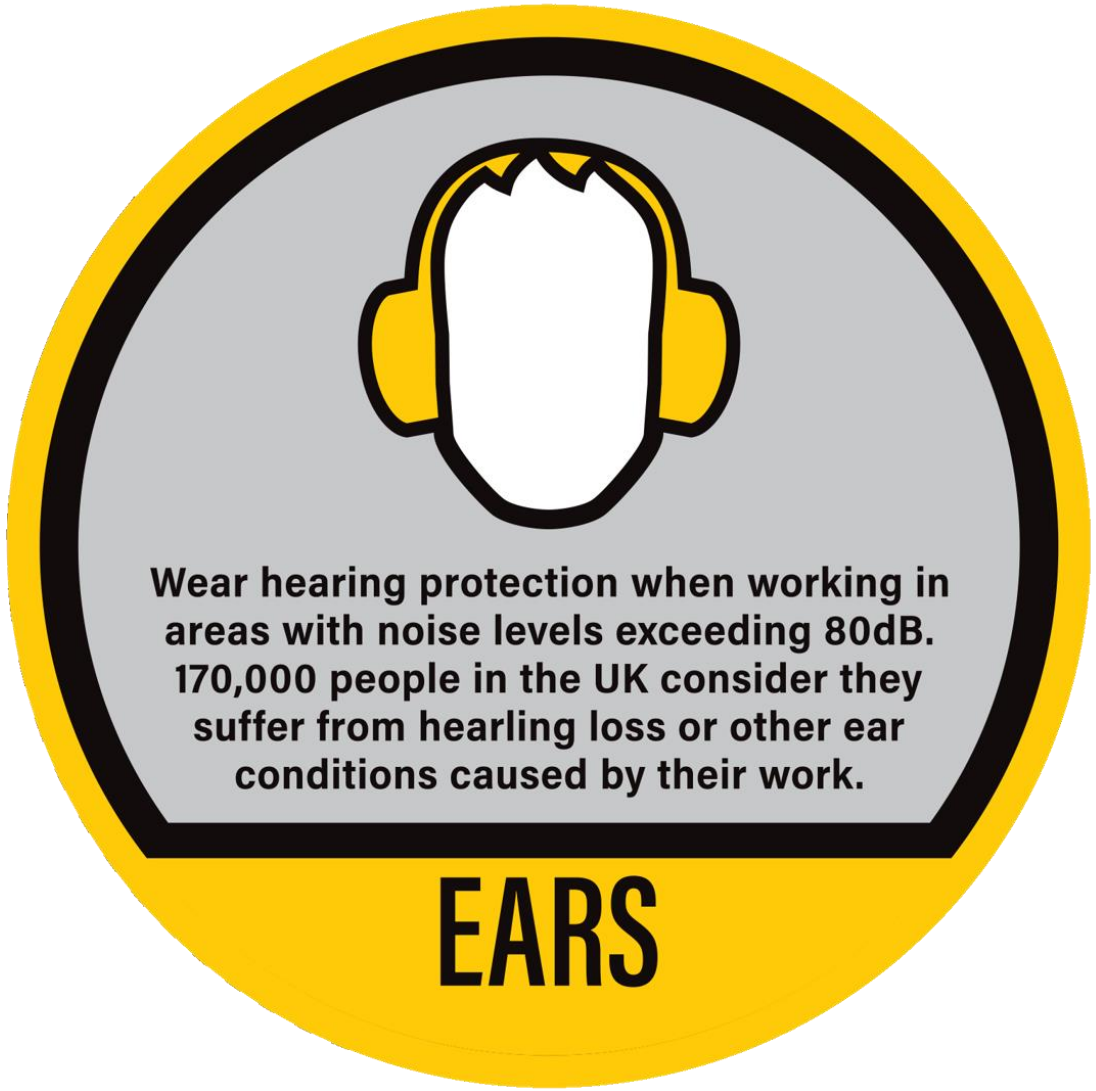

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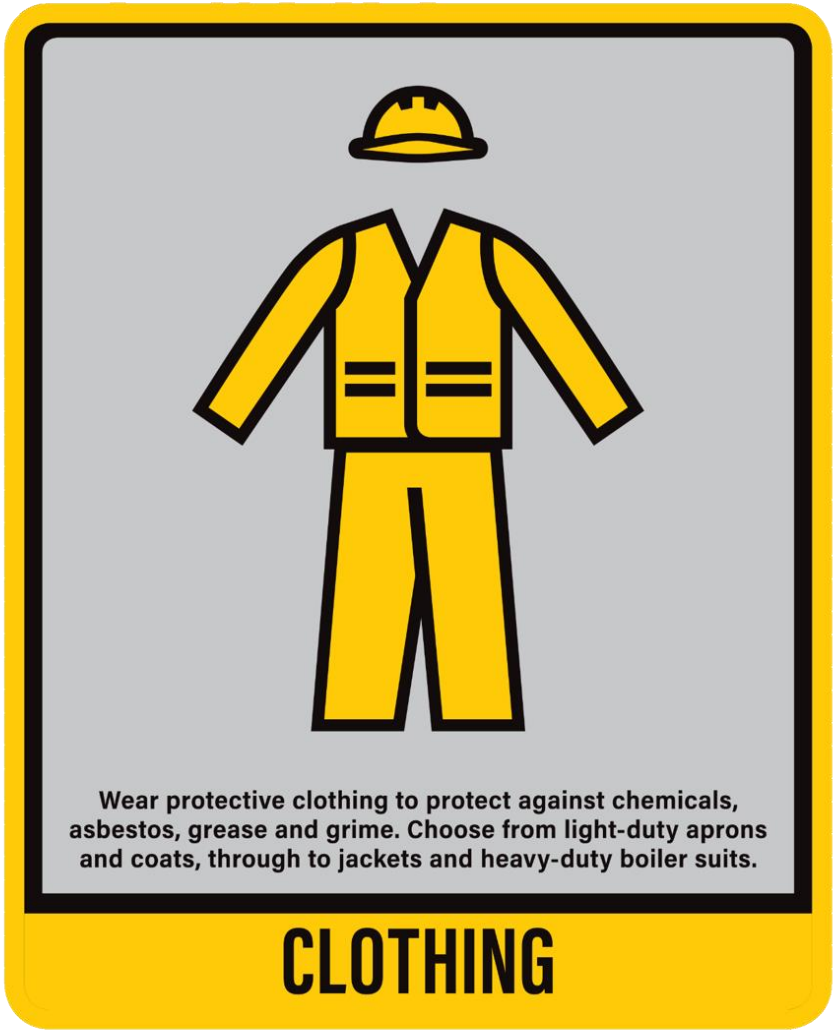

Personal Protective Equipment

Thank You

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