Ariel ELP Running Gear

Externally **L**ubricated **P**in

JGE:K:T Frames

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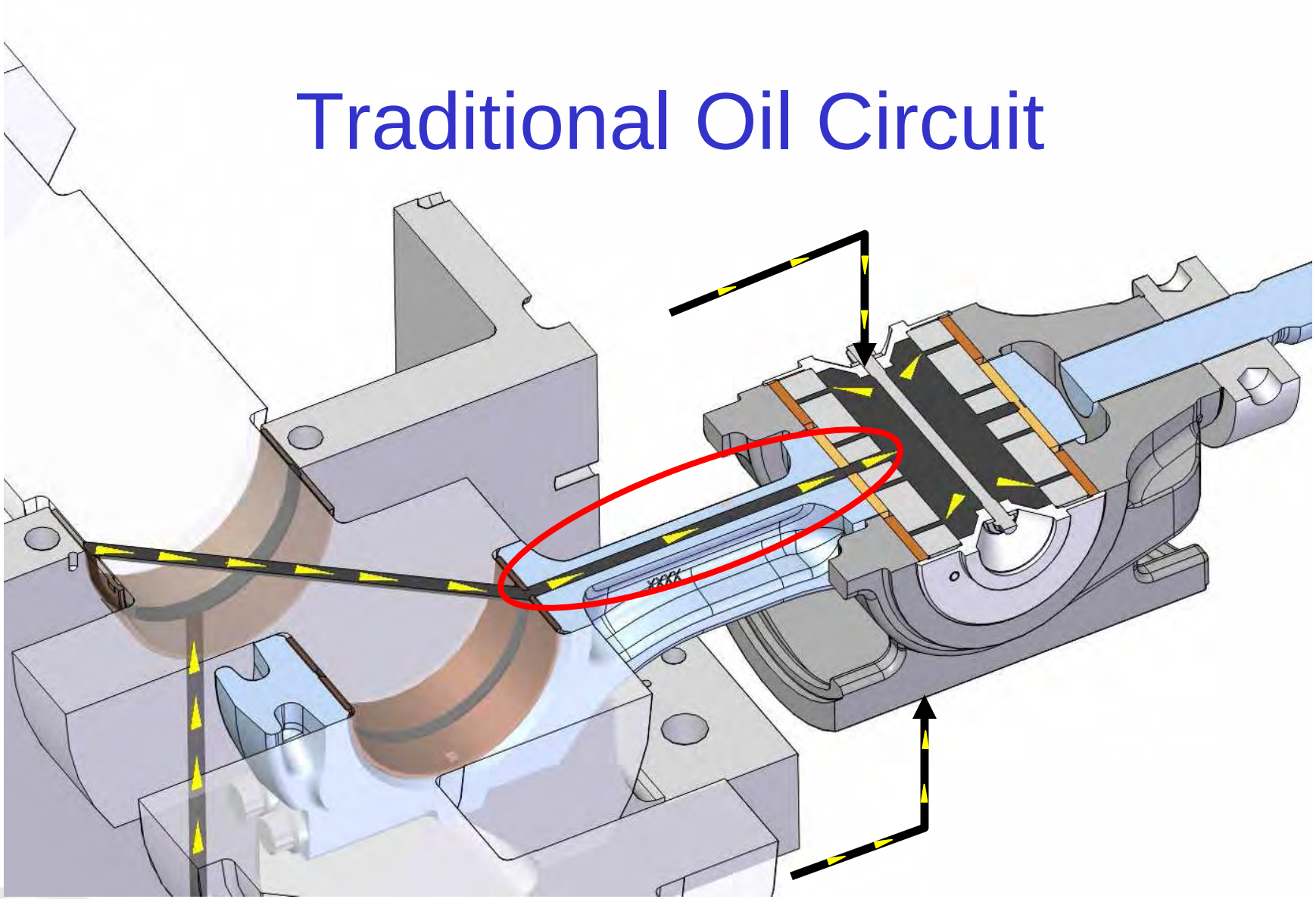
ELP

- Externally Lubricated Pin (ELP) was developed to give maximum unit flexibility with minimal bearing wear

ELP Benefits

- Increases bearing life
- Allows possibility of greater operational flexibility
- Provides better lubrication in big end connecting rod bearing
- Provides more oil to the crosshead
- Provides cooler oil to the crosshead pin

Traditional Oil Circuit



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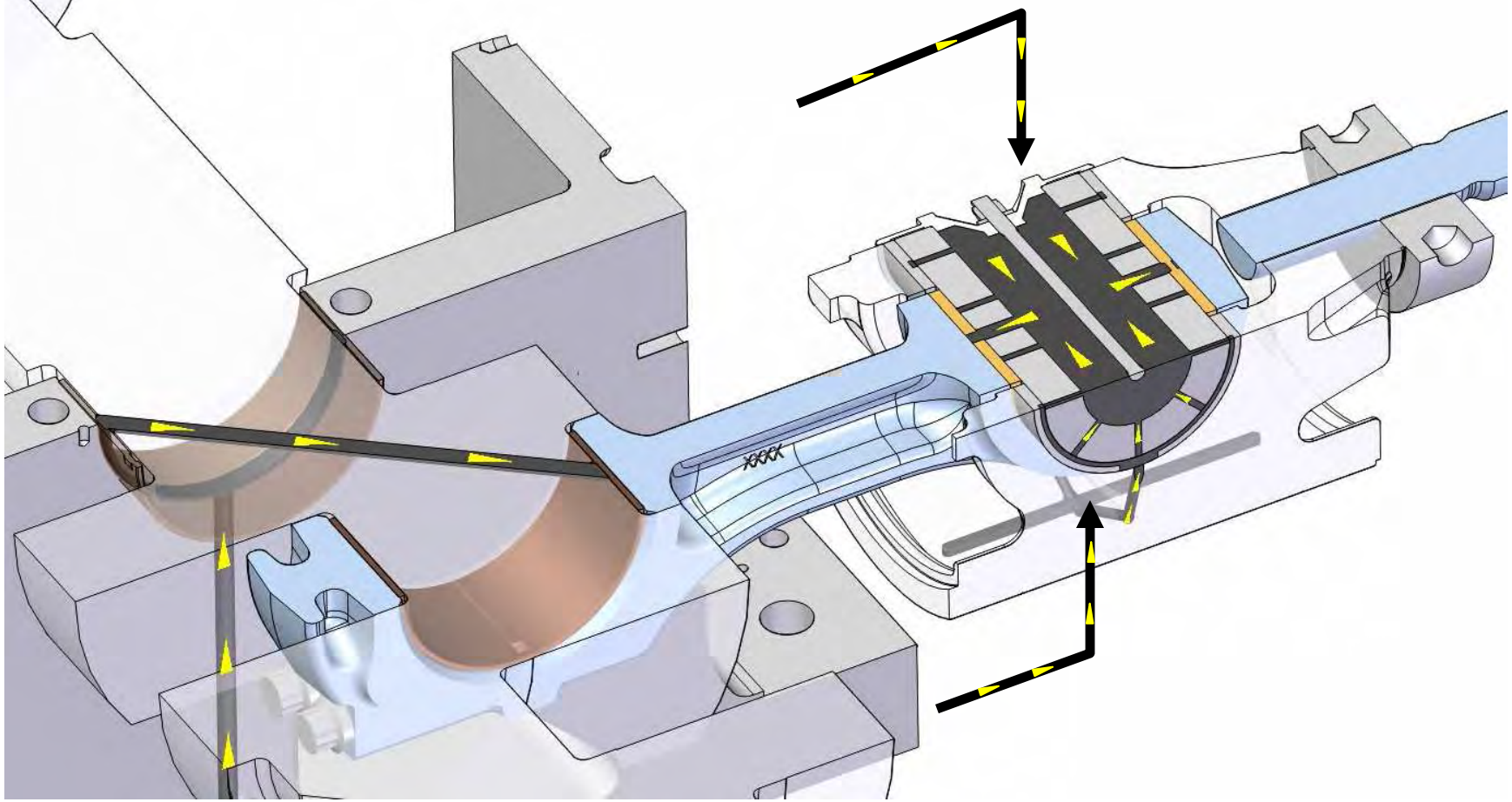
ELP Oil Circuit



The oil in the top and bottom external tubing used to lube the crosshead is fed through the crosshead to lubricate the crosshead bushings, crosshead pin and small end bushing

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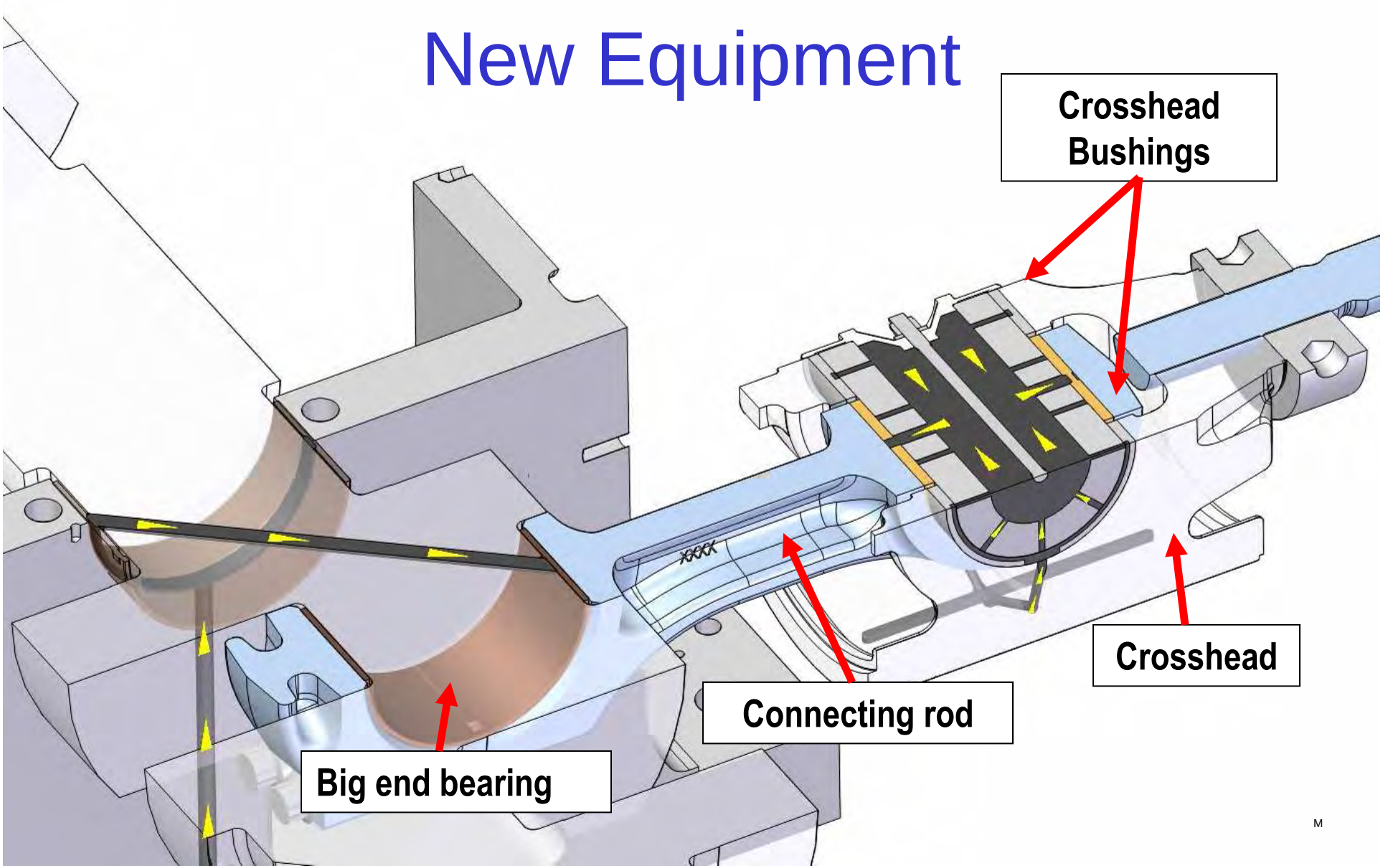
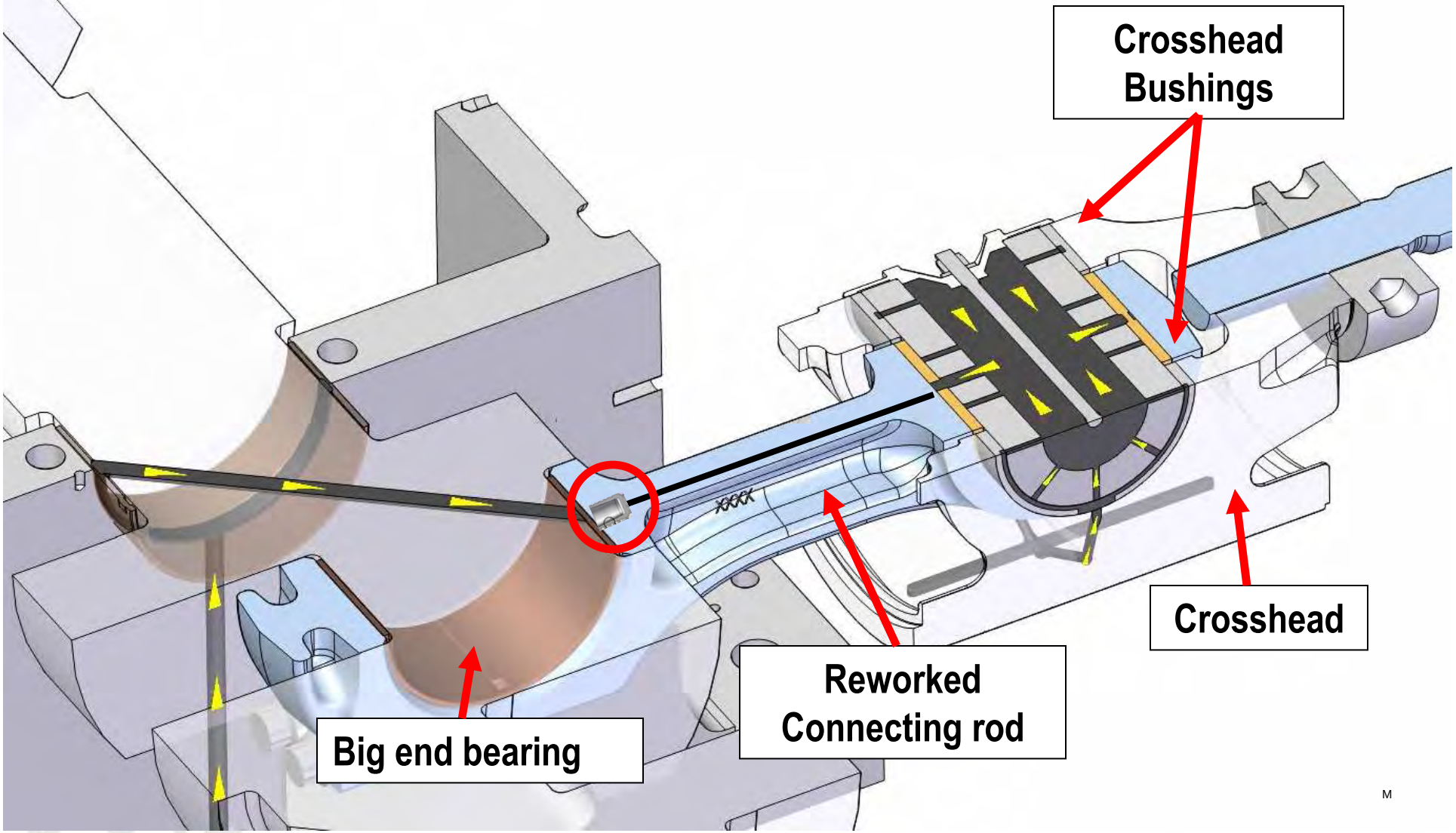
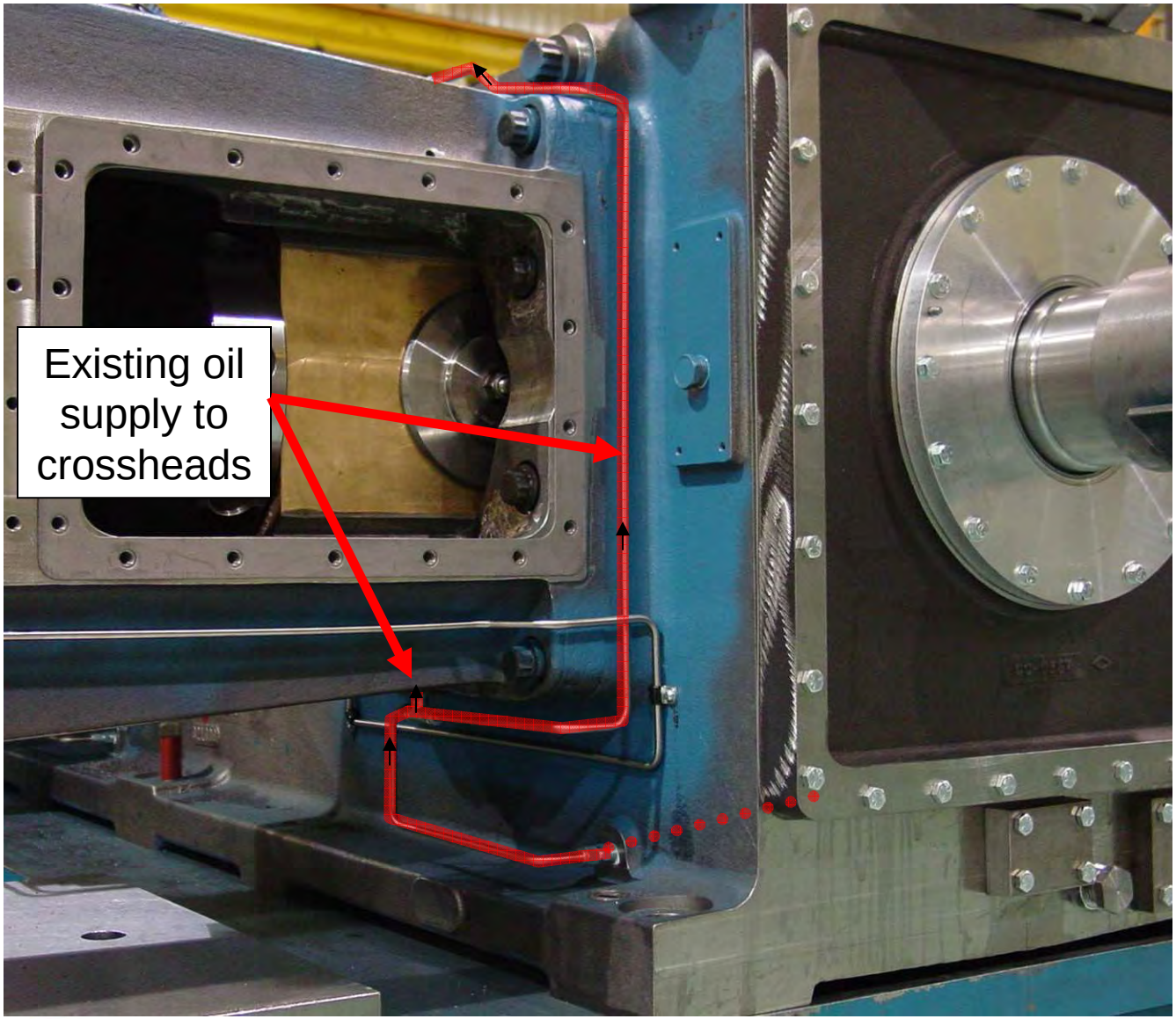
Parts that Are Different New Equipment



M

Parts that Are Different Upgraded Equipment





Crosshead Guide Lubrication Tubing

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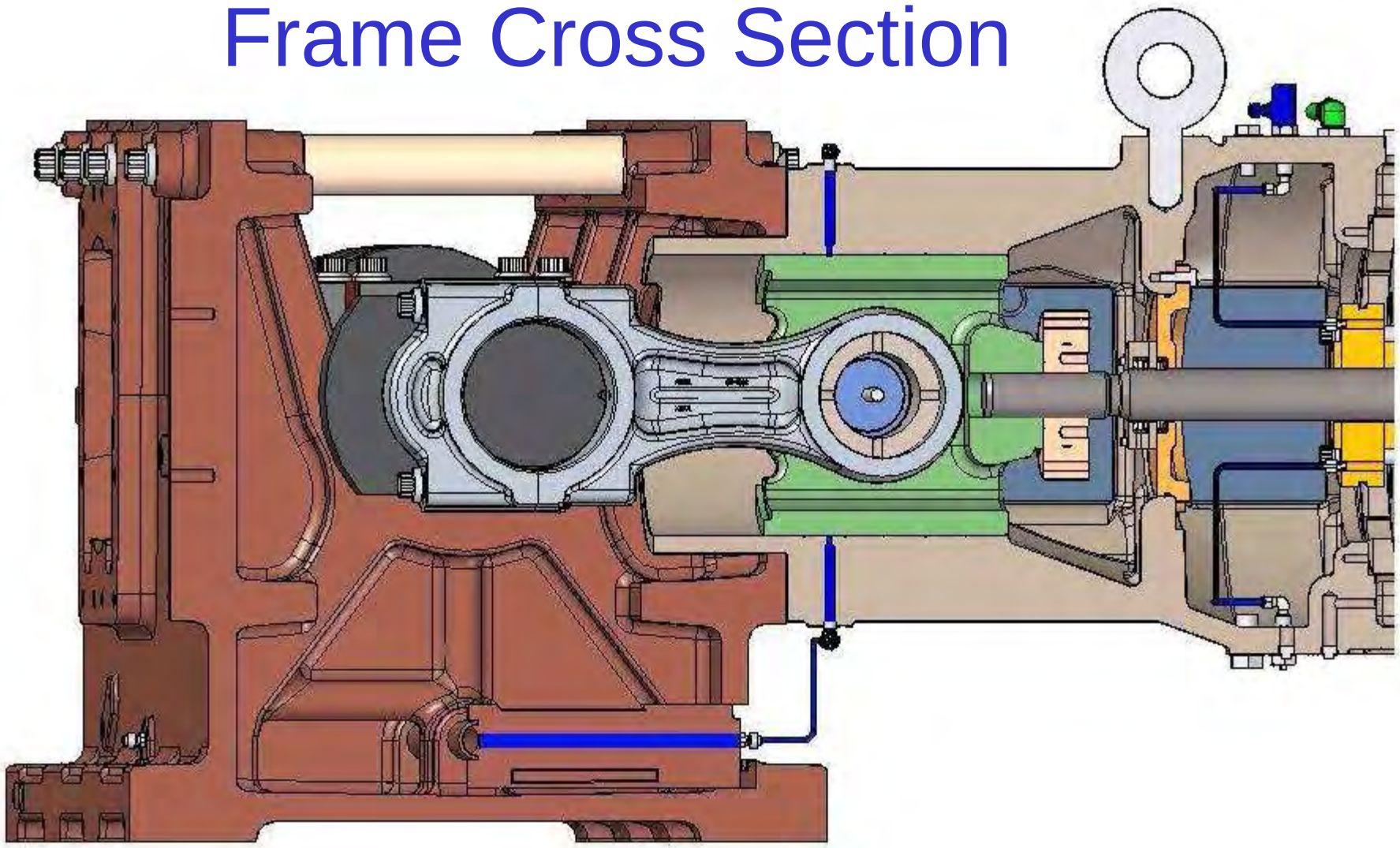
Frame Cross Section



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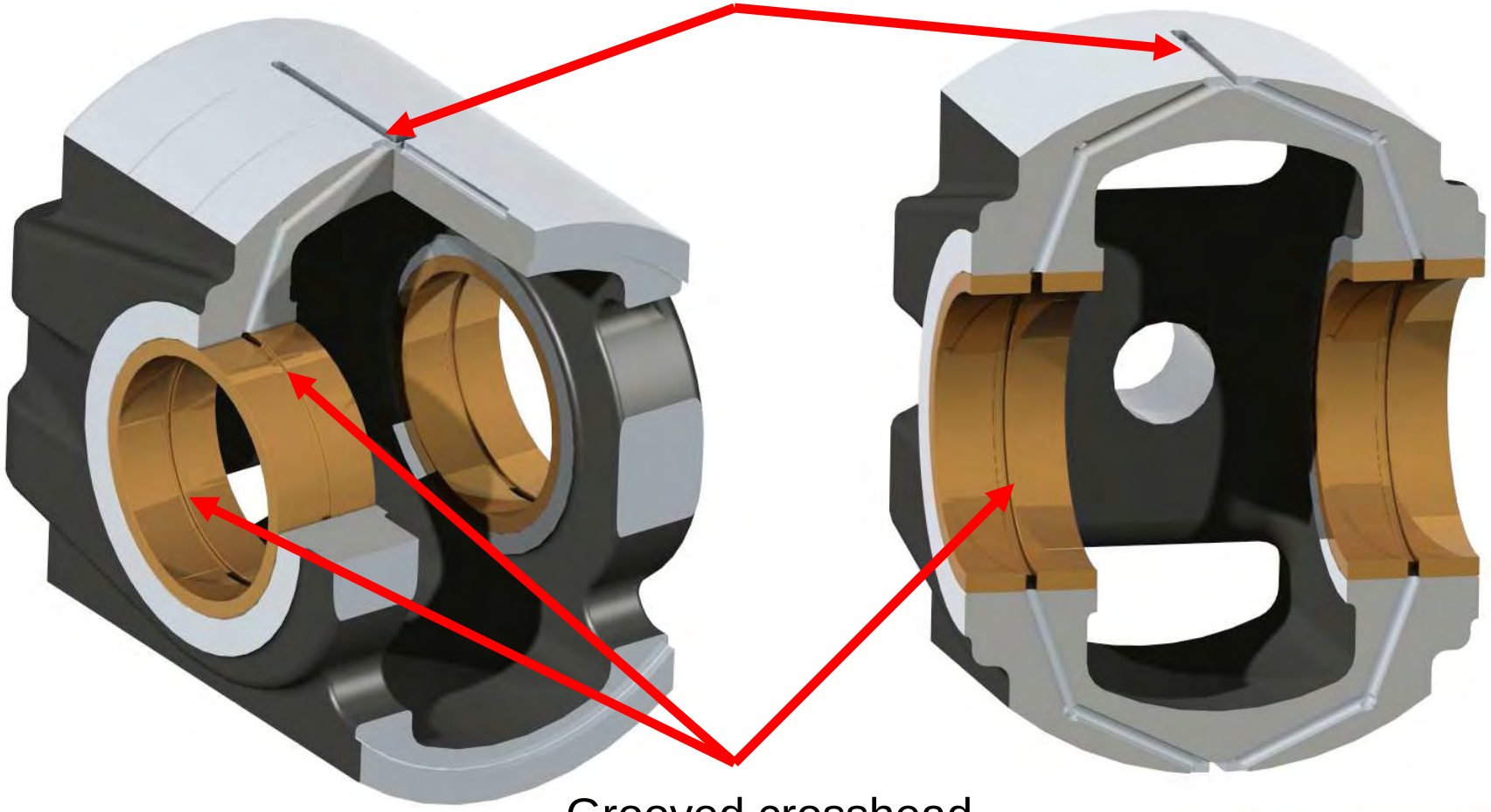
New / ELP Crosshead

Deep slot & drilling
in crosshead



Grooved crosshead
bushings

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New / ELP Crosshead

Deep slot & drilling in crosshead

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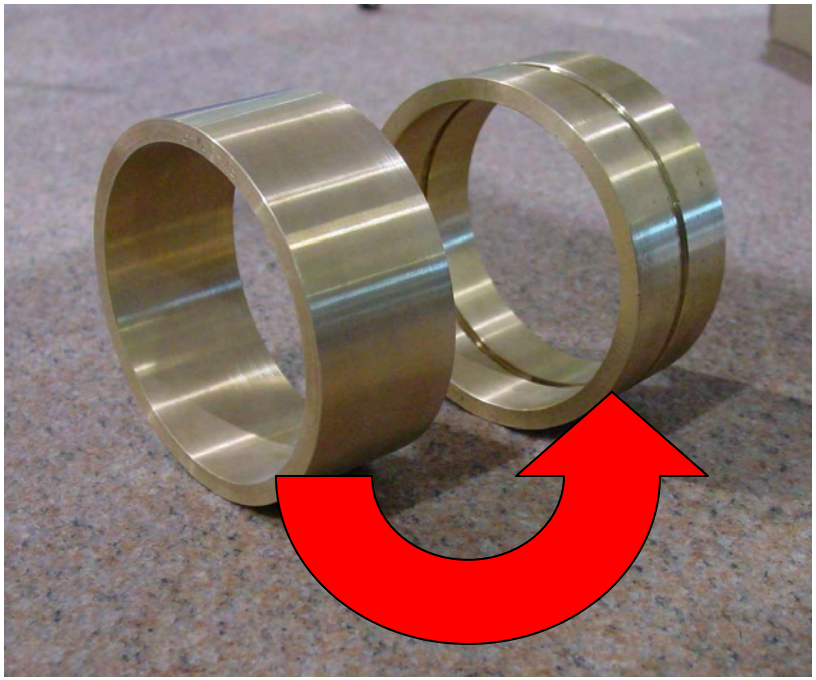
Traditional vs. ELP Bearings / Bushings

Big End of Connecting Rod

Traditional Bearing

ELP Bearing rod half (no groove) B-5250

Crosshead Bushing



Traditional Bushing

New / ELP Bushing B-5290

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ELP Conversion Process

- Remove piston & rod
- Remove crosshead pin
- Remove crosshead
- Remove connecting rod

- Rework connecting rod

- Install ELP connecting rod
- Install ELP crosshead
- Install crosshead pin
- Install piston & rod
- Check clearances

ELP Conversion Process

Parts Required

- ELP crossheads
- ELP Conn rod bearing half shells
- Conn rod plugs
- Gaskets / tag

Tools Required

- Con rod reamer kit
  - A-16559
- Standard Ariel tools
- Mechanics tools

Expected Time

- 4 person crew
- 4 throw - 12 hours
- 2 throw – 6 – 8 hours

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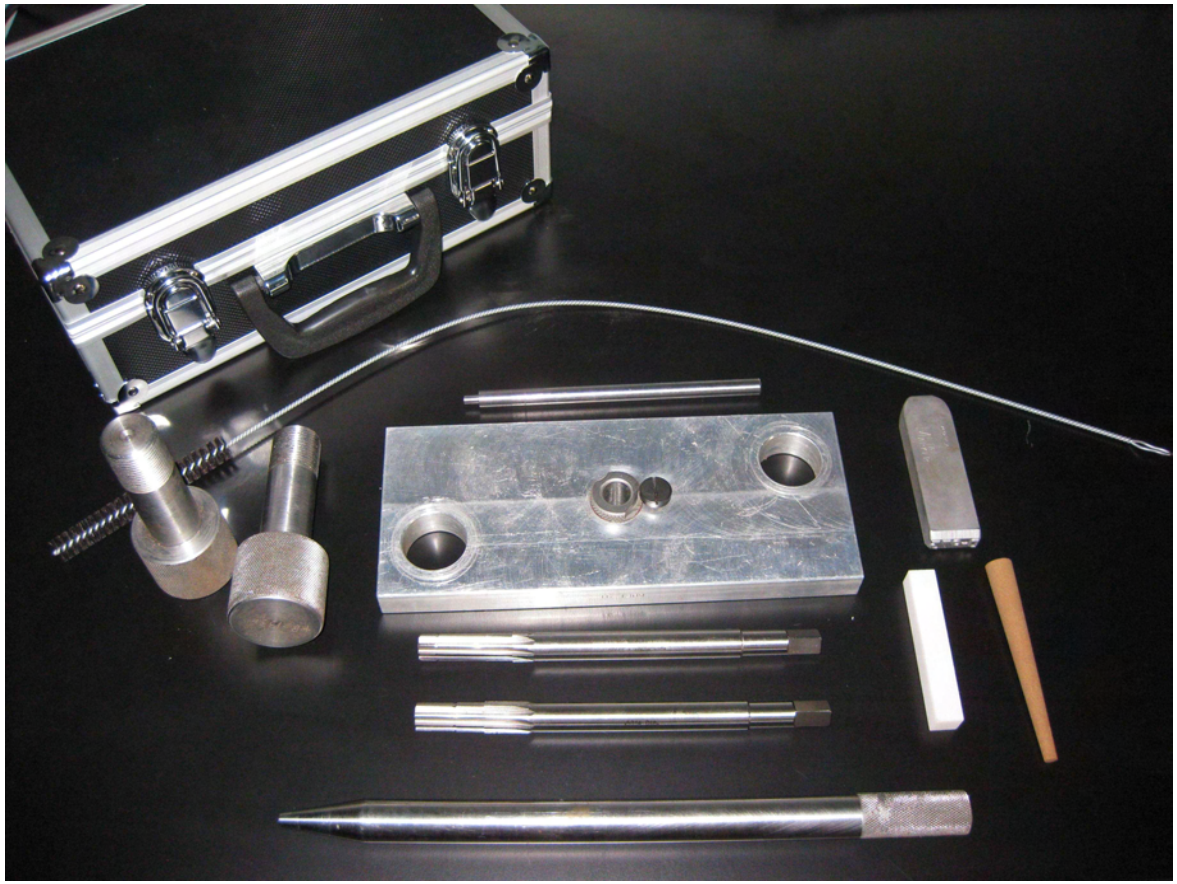
Lee Plug Installation Kit
Ariel Part #A-16559



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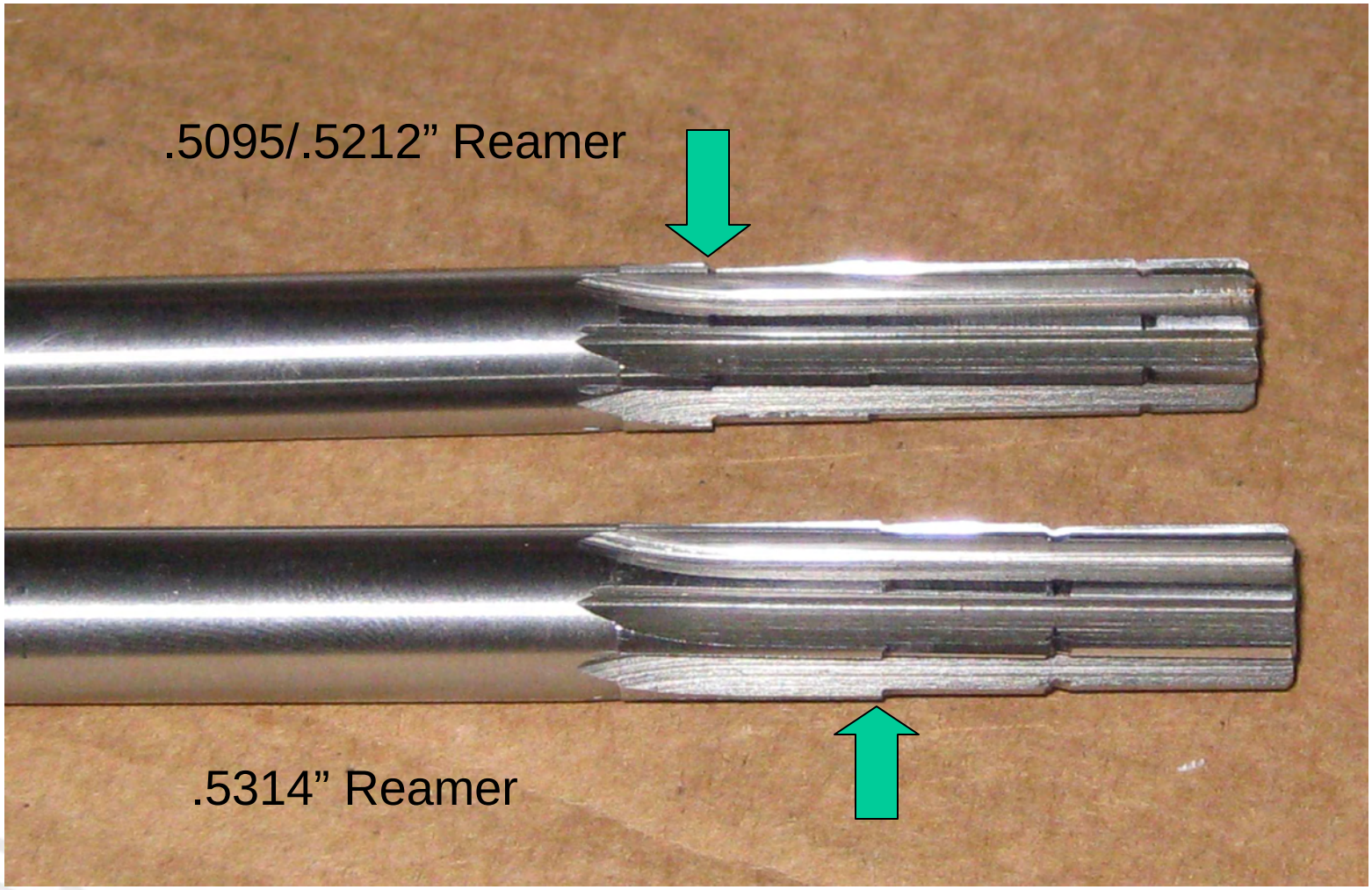
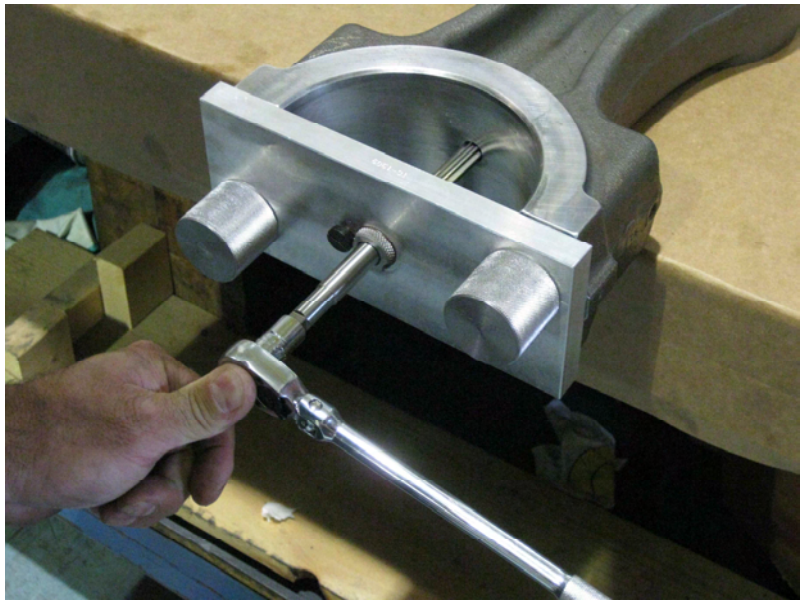
Lee Plug Installation

- Ream the hole until the large step of the reamer is just below the face of the bearing bore in the connecting rod.

DO NOT TURN THE REAMERS COUNTERCLOCKWISE

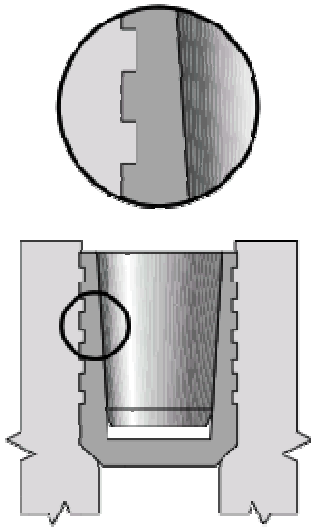


Lee Plug Installation



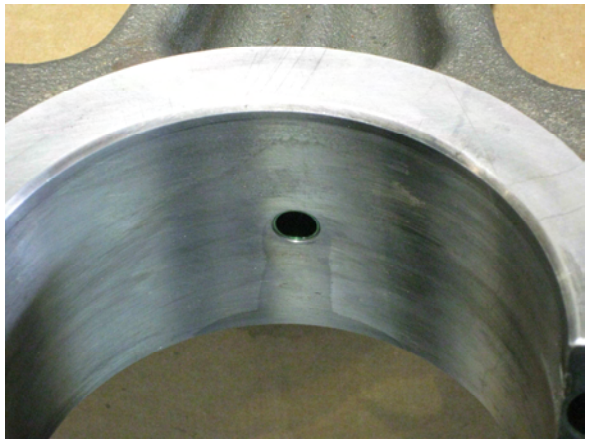
Lee Plug

- The Lee Plug is a cylindrical plug with a tapered hole part way through its center and numerous small grooves on its outside diameter. It is slipped into a reamed counter bore in the product. A tapered pin is then driven into the plug until the ends of the pin and the plug are flush with each other. Controlled expansion causes the lands and grooves of the plug to "bite" into the surrounding material forming independent seals and retaining rings. Result: a positive, reliable, leak and trouble-proof seal for both liquids and gases.



Lee Plug Installation

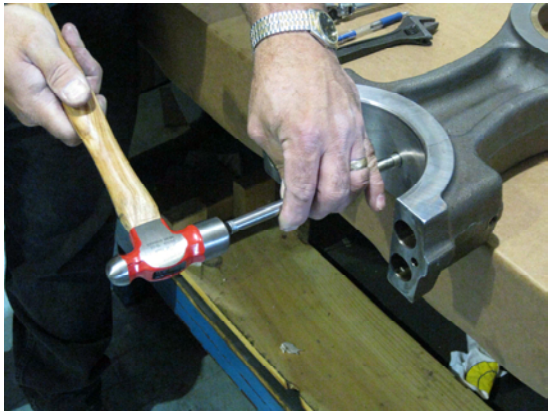
The Lee Plug is a 2 piece part consisting of a cap and a drive plug



- Test fit the green cap to see that it slides completely into the oil hole point first, and check that it does not protrude into the big end bore when fully inserted into the oil drilling. Remove the green cap.
- Double check that the oil hole is clean and dry, slide the green cap back into the hole.

Lee Plug Installation

- Take the aluminum drive plug and start it tapered edge first into the green cap. Use a drift and hammer to drive the core plug into the green cap, stopping when the core plug is seated in the cap.



- You will feel a difference in the hammer rebound, hear a ringing difference, and see the plug slightly below the edge of the cap when it is fully seated.

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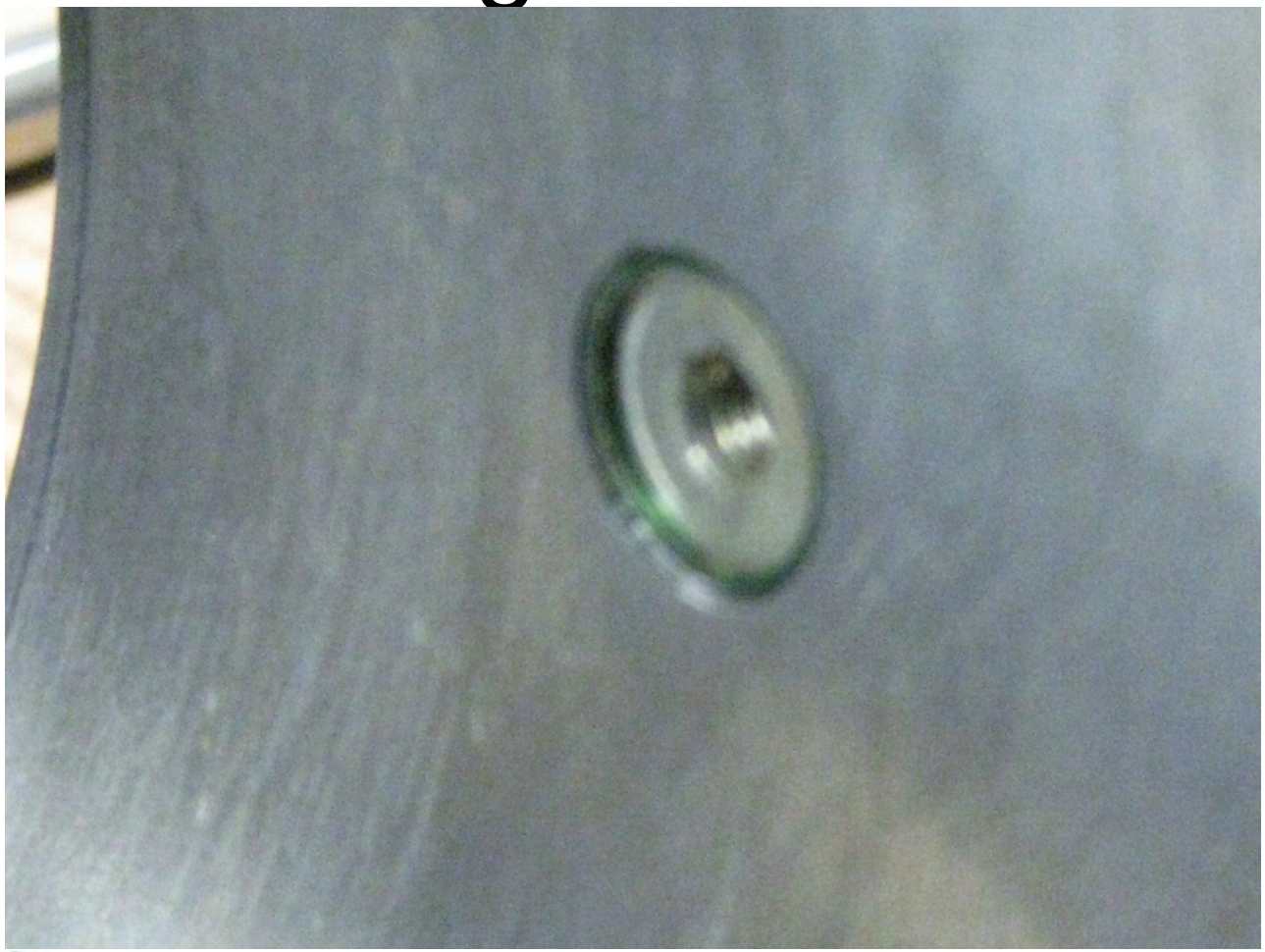
Lee Plug Installation



ELP Reconfiguration Tag

Traditional vs. ELP

	Traditional	ELP
Crosshead Pin	B-0773	same
Crosshead Pin Caps	A-3870	same
Crosshead Pin Bolt & Nut	A-3870 FN0461GA	same same

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Traditional vs. ELP

	Traditional	ELP
Con Rod Bearing	B-2082	B-5250
Connecting Rod Assembly - new	AD-0973	AD-5509
Connecting Rod - new	D-0973	D-5509
Connecting Rod –reworked		EP-2200-A D-5652
Connecting Rod Bushing	B-0772	same

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Connecting Rods

- The part number stamped on the top of the connecting rod will be the only way to determine if it is a traditional or an ELP unit other than disassembly and visual inspection

- Traditional
  - oil flow thru rod
  - grooved big end bearing
- ELP
  - No oil flow thru rod
  - Non-grooved big end bearing

Traditional vs. ELP

	Traditional	New / ELP
Crosshead Bushings	B-0787	B-5290
Working Crossheads		
XLT, ADI, 59.0#	D-3277	D-5581
LGT, DI, 74.9#	D-0868	D-5583
MED, DI, 105.2#	D-0869	D-5304
MED, DI, 131.8#	D-0870	D-5305
HVY, DI, 153.3#	D-0871	D-5306
XHV, BZ, 189.4#	D-0949	D-5517

Traditional vs. ELP

	Traditional	New / ELP
Balance Crossheads		
BAL, CI, 198.0#	D-0995	D-5638
BAL, CI, 237.0#	D-0996	D-5639
BAL, CI, 276.0#	D-0997	D-5640
BAL,CI, 336.0#	D-0998	D-5641
BAL, CI, 426.0#	D-2299	D-5642

Crossheads

- Traditional crossheads will be obsolete
  - Replacement crossheads will be the ELP style
    - Milled slot in crosshead
    - Grooved bushings
- Traditional crosshead bushings will be obsolete
  - Replacement crosshead bushings will be the ELP grooved style