

TSB DSD 0001

TECHNICAL SERVICE  
BULLETIN

**REMOVING THRUST  
ASSEMBLY IN 90AD EXTRUDER**



## SAFETY

J.C. Steele and Sons equipment is designed to process large amounts of heavy products. To accomplish many of the required operations of our customers, high horsepower and heavy components are required. A great deal of time and effort has been invested into our equipment to make them as safe as practically possible. The safety features are no substitute of caution and common sense. A careless moment is all that is needed to cause a serious accident. Please refer to the machine's Owner's Manual for a detailed list of safety precautions.

## GENERAL DESCRIPTION

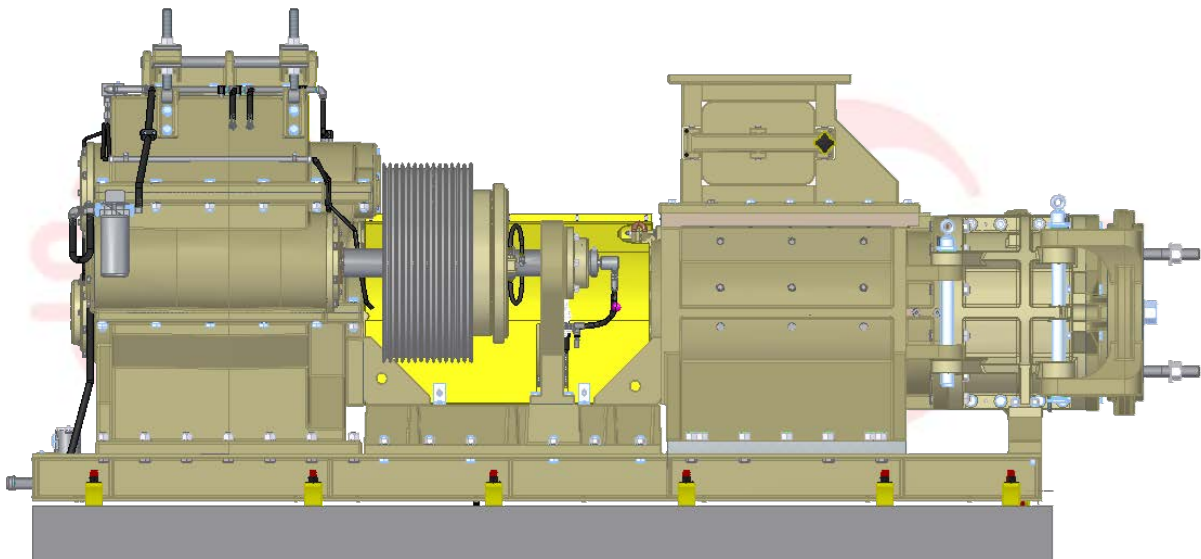


FIG 1: Side view of 90AD extruder

This bulletin outlines the procedure to remove the thrust assembly and shaft from the extruder. Other procedures may be necessary in order to accomplish this procedure, including the removal of the augers, liners, and liner adapters. The following procedure applies to machines configured with swinging doors or 3690 hydraulic die changer.

The thrust assembly along with the shaft weighs roughly 3100 lb. (1410 kg). The center of mass of the thrust assembly and the shaft is located  $72\frac{3}{8}$  in (1.84 m) from the auger end of the shaft.

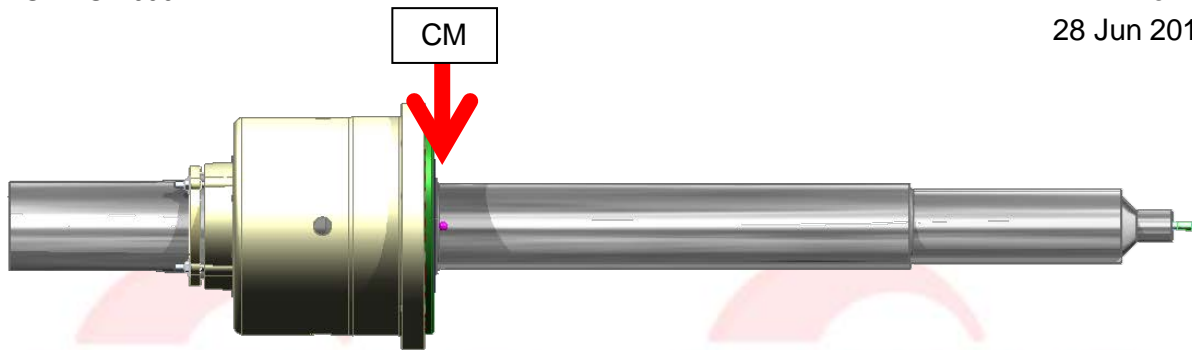


FIG 2: Center of mass of the thrust assembly and shaft

## SPECIAL TOOLS NEEDED

- 25 or 30 ton jack (hydraulic power pack with pancake cylinders is preferable)
- 6 or 8 inch (0.15 or 0.20 m) H beam, 3 feet (0.9 m) long (or equivalent)
- 2 ton come-along (hand winch)
- Industrial 2 ton minimum fabric straps, approximately 15 feet (4.6 m) long

## MANPOWER ESTIMATE

This procedure will require 2 men for 4 hours, depending upon the maintenance state of the equipment and ease of access.

## PROCEDURE

1. Follow plant procedures for **shutting down all equipment on extrusion line**, to include maximum removal of extruding material from the extruder lower vacuum chamber
  - In the case of a **swinging door arrangement**, remove both **doors** and **center door holder** from the exit of the extruder
  - In the case of a **3690 HDC**, prepare **die holders** such that none are in position in front of extruder exit. Removal of the **central liner clamp ring** is necessary to pull the thrust pot through the exit
2. Follow all plant procedures to **lock out extruder and pug sealer from electrical sources**
3. Remove any **safety guarding** in the area between the **lower vacuum chamber** and the **gearbox**
4. Remove **augers, liners, and liner adapters** plus one side of the **alignment key** for barrel adaptors (one long and one short)
  - Refer to machine owner's manual for this task
5. Remove the **shaft coupling** between the gearbox and vacuum chamber
  - Orient the coupling vertically with the split on the horizontal plane

- Loosen the **bolts** on the shaft coupling
- The bottom half of the coupling will start to lower (a pry bar can be used to aid in this process)
- A strap can also be used to help lower the coupling.
- Once the **shaft coupling** rests on the platform, it may be necessary to move it to the side to make room for the **thrust assembly** removal
- The top half of the coupling can then be removed by lifting
- Removal of **shaft keys** (quantity 2) from the auger side of the coupling is also required. Push-off holes are provided for convenience

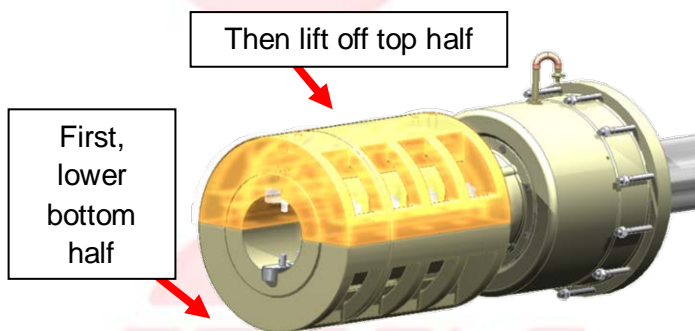


FIG 3: 90ADEX shaft coupling

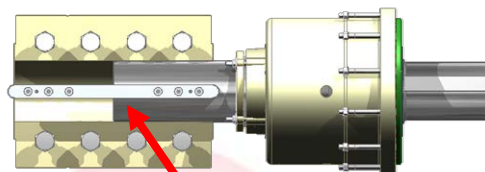


FIG 4: Cross section of shaft coupling

6. Fully drain the **oil** from the **thrust assembly** and dispose of it properly
7. Carefully remove all piping attached to the thrust pot
8. **OPTIONAL STEP:** Loosen the **thrust assembly nut** (8NA)
  - Complete this step if further breakdown of **thrust assembly** will be required in the future. The torque required to loosen the nut is so great that using the extruder gear box as a torque multiplier is helpful
  - This can be accomplished by wedging a short piece of angle iron or key stock against the notch where the clamping screw is in this lid and the bottom of the vacuum chamber, and by turning the machine backwards by hand

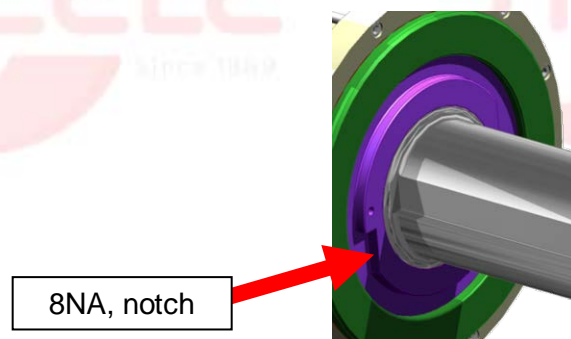


FIG 5: Thrust assembly nut

9. Remove the **12 bolts** holding the **thrust housing** (8) in the vacuum chamber
  - These are socket head bolts and may require an Allen wrench welded to a 4 to 5 foot T rod to prevent the bolt from turning

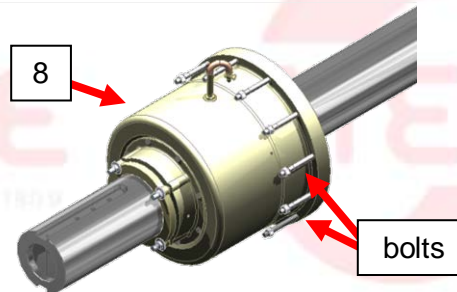
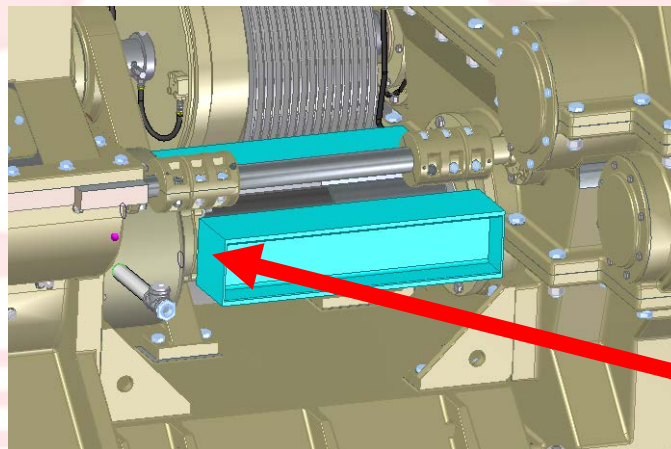


FIG 6: Isometric view of thrust housing with bolts

10. Against a **6 or 8 inch H beam**, 3 feet long, jack against the bottom of the **thrust housing**
  - If it does not move with 20 tons pressure, apply heat to the vacuum chamber on two sides of the thrust assembly
  - Make sure the heat is applied only to the casting and not the thrust assembly



Apply hydraulic jack here

FIG 7: Using H beams to jack against the bottom of the thrust housing

11. Once the **thrust pot** moves 5 inches, it should be loose in the hole and may be pulled out the front



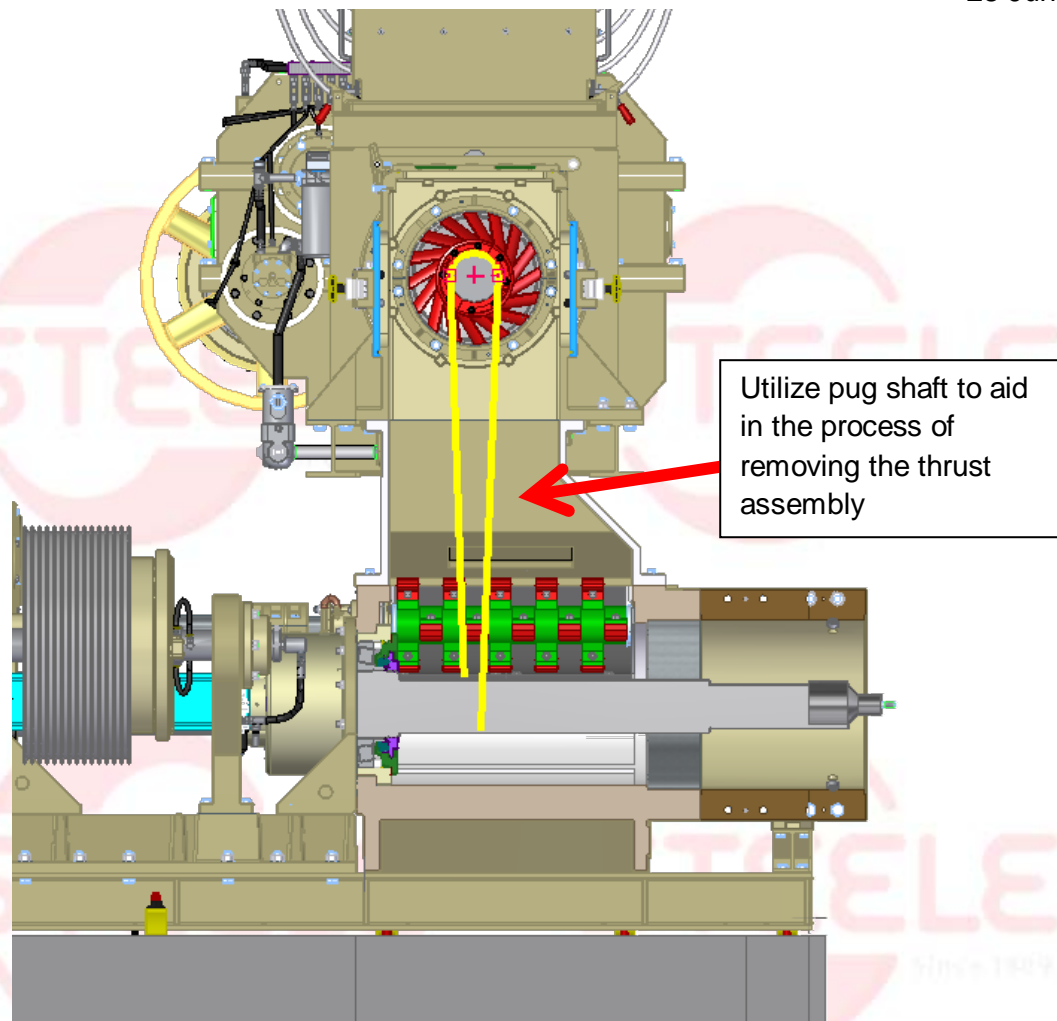


FIG 8: Cross section of pug sealer and extruder, showing how the pug sealer can be used to aid in the process of removing the thrust assembly

12. For storage purposes, a **NEW thrust assembly** contains 5 gallons (18.9 L) of **Lubriplate 8 oil**. Take out the plugs, drain the oil completely, then pour oil into a clean container
13. Slide the **NEW or REBUILT thrust assembly** in place, keeping the **1-1/2 pipe thread hole** up and the **grease fitting hole** to the left as you face the machine
  - Apply a liberal coating of anti-seize to the thrust pot pilot, ensuring that the gasket provided for the thrust pot/vacuum chamber wall is in place

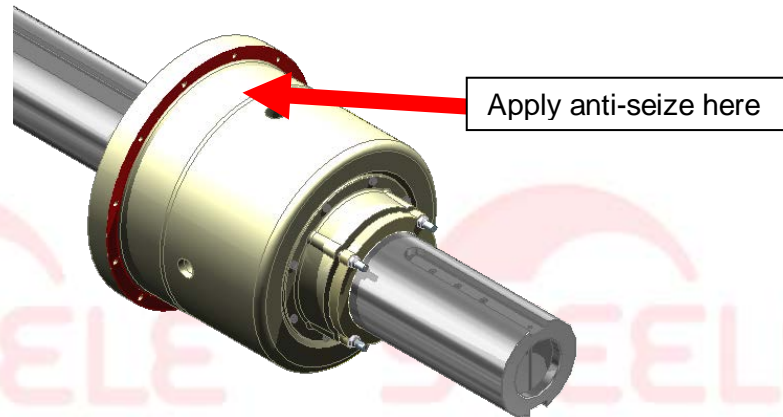


FIG 9: Isometric view of thrust pot, showing where anti-seize is applied

- Alignment 5/8 inch (16 mm) rods 2 or 3 feet (0.6 or 0.9 m) long help keep the bolt holes lined up as you slide the assembly in place
  - To move the thrust pot into position, follow and utilize the tools in step 11
14. For the last 5 in (0.13 m) of travel, the tail shaft of the **gearbox** should be used for alignment, utilizing **straight-edge guides**. It is at this state that particular care should be given to keeping the **thrust pot** level and moving the assembly **slowly**
- **Come-alongs** (hand winches) may be needed to provide force to move the pot once inside the pilot. These should be anchored somewhere along the **gearbox** face and connected to eye-bolts placed in the **auger shaft coupling retention holes** on either side
15. Once the auger shaft is fully against the tail shaft and the **keys** are bolted in place, tighten the **packing gland** slightly and evenly
- This should not be pulled up tight until oil is in the thrust assembly and the machine is running
  - Tighten the 12 bolts that hold the thrust pot to a nominal torque of 90 ft lb (122 Nm)

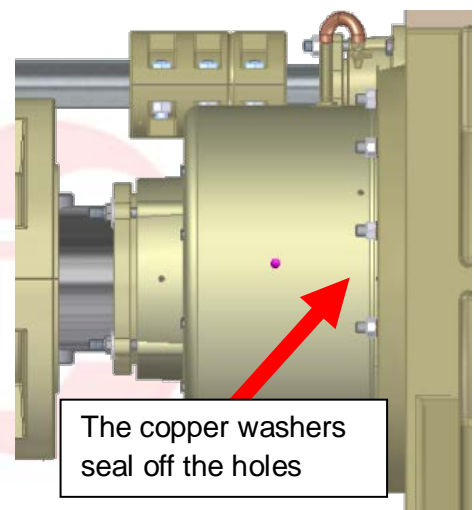


FIG 10: Side view of the thrust pot attached to the lower vacuum chamber

16. Apply grease to both **grease fittings** until it is visible inside the **vacuum chamber** and at the **packing gland**
17. Reinstall all **plumbing fixtures** to the **thrust pot** and fill with 2.5 gallons (9.5 L) of the **Lubriplate 8 oil** retained from step 12
18. Replace **coupling**
  - The **coupling** is designed so that there is a  $\frac{1}{32}$ " (0.8 mm) gap between the halves, ensuring that they are clamping onto the shaft and not each other
  - First install  $\frac{1}{32}$ " (0.8 mm) **shim** on one side and tighten 2 of the **exterior bolts**, leaving a gap in between the couplings
  - Move to the other side and tighten all 4 bolts, ensuring there is at least some gap resulting
  - Loosen the 2 bolts on the shim side, remove the **shim**, retighten and add final 2 bolts
  - Tighten all bolts to a minimum torque of 1800 ft lb (2440 Nm)

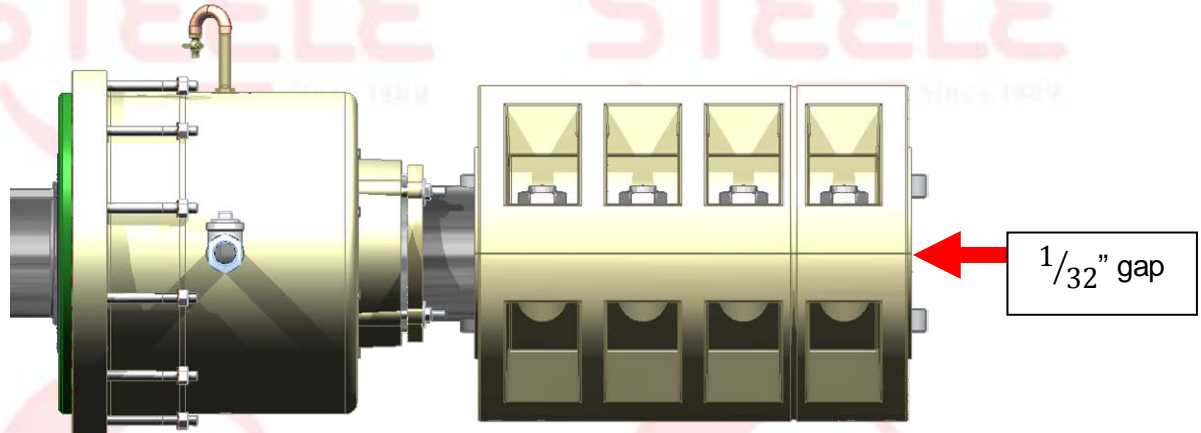


FIG 11: Side view of thrust assembly and shaft coupling, showing the placement of the coupling gap

19. Replace all **keys**, **liners**, and **augers** in the **lower vacuum chamber** and **front barrel**
  - Refer owner's manual for this task
20. Reinstall **liner clamp ring** or **hinged door assembly**
21. It is advisable to run machine and test for **vacuum and oil leaks** before reintroducing material or reinstalling safety guarding