



Date: April 28, 2022  
Applicability: PowerDrive  
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## BACKGROUND INFORMATION

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PowerDrive tools are designed and qualified to withstand vibration and loading associated with drilling. During transportation and surface handling, the tool can be subject to impact loading without fluid to cushion internal mechanical components and damp the residual vibration. This can result in mechanical loads and vibration modes within the assembly that are not possible during drilling.

What is presented here is to promote awareness and suggestions for management of transport of PowerDrive.

## COMMON FAILURES OBSERVED

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Several failure modes are known to be associated with transportation:

- Sensors and electronics are known to be susceptible to transport. 2-3 tools per month leave the base confirmed to be working in the flow loop and have failed sensors on first flow/data recorded in the field. Accelerometers are particularly susceptible to the high frequency residual vibration of a dropped or impacted assembly when they are not powered during transport.
- Internal carbide bearings are susceptible to point or line loading from impact of mating parts that isn't damped by fluid.
- Spindles (end of the torquer assembly that supports the weight of the tool) are known to crack from dropped assemblies.
- Torquer housings are susceptible to harmonics generated with an impact load to the tool. These cracks, although not common, can cause complete flooding of electronic assemblies requiring full tool re-manufacture.



Figure 1. Examples of cracked torquer bearing likely due to transport damage.

## PREVENTATIVE MEASURES

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Fortunately, most transport damage can be avoided by recognizing the risks and handling the tool with care. Some suggestions below to mitigate the effects of transport damage are listed below:

- PowerDrive should not impact racks or ground during logistical operations
  - Don't allow the tool to roll off the forklift into another structure/tool/ground
  - Handle the tools one at a time to avoid impacting each other or another object
- Secure PowerDrive directly to wood blocks for trucking.
- Store at ground level and not on racks when possible
- Use slings to handle the tool, when possible, rather than rolling onto/off of forks
- If storage on a rack is required, rubberize the racks to help mitigate impact
- Encourage transport vendors to report any drop or impact to the PD tool. Do not run a tool that has been suspected of a drop from any height.



Figure 2. Pics of rubberized racks in the shop.