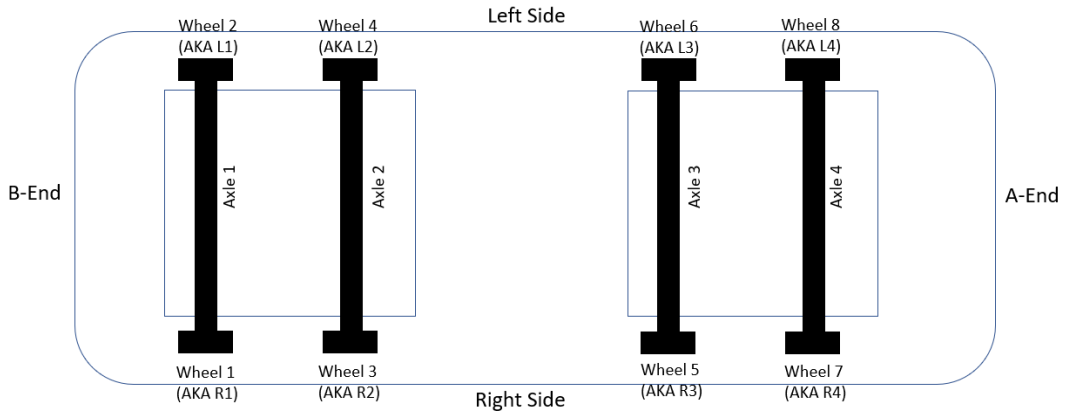
What follows is an explanation of how investigators at Beech Grove on May 11, 2022 determined the orientation of wheels from Wheelset Nos. 1 and 2 on car AMT 32050.

1. The A-end of the car was leading in the direction of travel. This means that the "left" side of the train was also the "left" side of the car when using AAR and Amtrak car nomenclature definitions.



2. Wheelset No. 1 was identified as having serial number BDO3821 using Amtrak records.

Figure 1. Car 32050 Wheelset No. 1 showing ID No. BDO 3821 and tags placed by investigators at Beech Grove on May 11, 2022

3. Wheelset No. 2 was identified as having serial number BDO3221 using Amtrak records.

Figure 2. Car 32050 Wheelset No. 2 showing ID No. BDO3221 and tags placed by investigators at Beech Grove May 11, 2022

4. Investigators used FRA Field Notes to orient Wheelset No. 2 first.
    a. FRA Field Notes indicate that the Left No. 2 wheel had evidence of impact marks in the wheel flange.
    b. Investigators located the impact marks in the wheel flange in the FRA field note photographs.
    c. Investigators then located the impact marks on the wheel at Beech Grove that had matching flange impact marks.
    d. This was determined to be the wheel on the left side of Wheelset No. 2. This wheel is defined as wheel location number 4. It was positioned on the left side of the train prior to the derailment, on the high side of the accident curve, the south side.

ATK 32050

The following defects were noted on the sleeper car that was positioned as the third car behind the two locomotive train consist remaining upright.

The B-end of the passenger car rear trailing axle showed signs of all four wheels were off the rail. The left number two wheel had evidence of heavy impact marks on the wheel flange as noted in the photos. The left number one brake rotor showed evidence of dragging. The B-end stabilizer bars were bent and damaged. The B-end coupler right side bump stop was broken and impact marks on the top of the coupler shank from the buffer casting. The B-end right side truck frame had signs of dragging. The B-end right side spring saddle had signs of dragging.

Figure 3. Excerpt from FRA field notes from Joplin, MT on-scene phase. Highlighted portion describes damage to the L2 wheel, consistent with one of the wheels profiled in Beech Grove.

Figure 4. Photograph of the L2 wheel under the car while still on scene at Joplin, MT. This wheel matches the FRA description of the L2 wheel.

Figure 5. Photograph of the wheel at Beech Grove on May 11, 2022. This wheel is known to be from the 2nd axle of 32050, and this flange matches the wheel known to be the L2 wheel.

5. Next investigators turned to determining the orientation of Wheelset No. 1.
6. Investigators noted that Volpe Staff took two photographs of the right side, B-end of Car 32050 that clearly showed a broken car side frame bump stop. These photos were labeled in the field by Volpe staff and could be confirmed to be oriented accurately by investigators who had been on scene.
7. A close examination of this photo showed distinct and unique markings on the Wheelset No. 1, right side, roller bearing cap bolts.
8. These distinct marks were found on bearing end cap bolts on Wheelset No. 1 in Beech Grove.
9. Therefore, the wheel with the bearing displaying those unique markings was determined to be the Axle No. 1, Right Side wheel. This is the Amtrak Position 1. The right side of the train, low side of the curve, north side geographically.

Figure 6. Photograph of the 32050 north side truck, showing bump stop damage. This photograph was taken by and annotated by Volpe staff while on scene. The north side corresponds to the right side of the train and the right side of the car. (Low rail)

Figure 7. Photograph of the same 32050 truck with bump stop damage, taken by a different Volpe investigator.

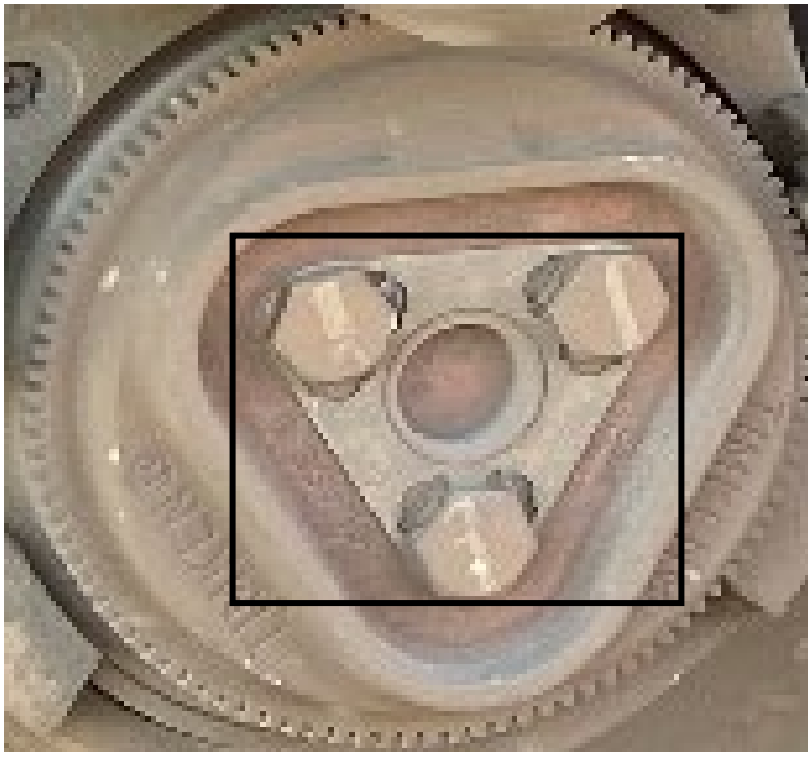


Figure 8. This is the same photo as above, focused on the R1 bearing cap. The bolts have distinct paint marks, including an upside down "U". This same bolt can only be seen on one bolt from Beech Grove on May 11, positively identifying the R1 wheel.