

CASE STUDY: USING NGRAIN 3D EQUIPMENT SIMULATIONS TO ADDRESS CRITICAL TRAINING GAPS

BACKGROUND

The mission of the U.S. Army 187th Ordnance Battalion Wheel Vehicle Mechanic School (WVMS) at Fort Jackson, SC, is to produce specialists in light and heavy wheeled vehicle repair and recovery. The WVMS schoolhouse is responsible for assessing the training curriculum and implementing new training methods as required. On average, 5,000 vehicle mechanics are trained annually in the 63B Wheeled Vehicle Mechanic course, which represents approximately 60% of the Army's wheeled vehicle mechanics. The effectiveness of training provided by the WVMS has a direct impact on the Army's operational readiness.

CHALLENGE

The peacetime service life for a HMMWV (High Mobility Multi-Purpose Wheeled Vehicle) is 14 years. In combat, the vehicle's service life has dropped to five years. Based on feedback from forward deployed troops, the WVMS identified that one of the most common problems with the HMMWV is that a wheel can fly off while driving. This dangerous situation occurs when the lock washer on the geared hub spindle is incorrectly installed.

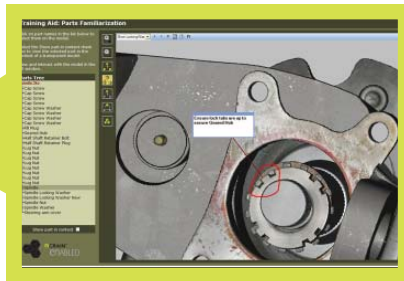
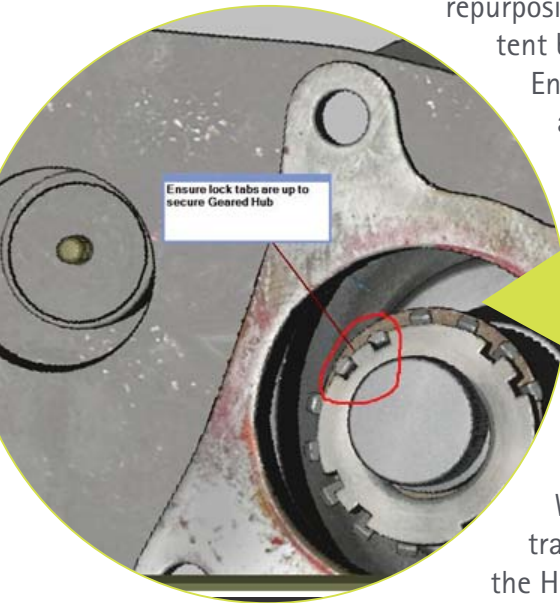
The problem arises when a mechanic does not replace the lock washer when servicing the bearings, or installs the lock washer incorrectly by not bending the lock washer's tabs into the locknut slots. The tabs can crack or break off if they are too worn, not replaced, or not fully seated in the lock washer's slots. In both cases, the geared hub may not be fully secured. Vibrations during driving may then cause the spindle lock nut to loosen and come off, putting the entire wheel assembly at risk of detaching from the vehicle – endangering both Soldier safety and mission success.

The WVMS determined that the current training materials and curriculum were insufficiently preparing mechanics for this critical maintenance task. They determined a need to augment existing training with materials that would specifically address this training gap.



SOLUTION

The WVMS was able to acquire copies of NGRAIN 3D HMMWV wheel system simulations without any funding requirements, by repurposing NGRAIN content being used by the Engineering School at Fort Leonard



Wood, MO to train mechanics on the HMMWV brake system. Using a copy of

NGRAIN Producer, NGRAIN's commercial-off-the-shelf software, WVMS instructors with no programming skills or 3D experience, were able to create a 3D animation of the maintenance procedure in a matter of hours. The 3D procedural animation includes a voice-over that narrates the procedure and highlights critical steps. The animation clearly visualizes the critical steps that maintainers were missing, allowing them for the first time to fully comprehend the procedure. The WVMS integrated the NGRAIN simulations into their classrooms without changing the Program of Instruction

RESULTS

The program was immediately integrated into the HMMWV mechanic training course and positive results of this curriculum addition were

recognized within weeks. Organizations receiving WVMS graduates contacted the instructors to tell them that they were no longer experiencing the HMMWV wheel problem anymore, and asked "What did you change? These mechanics are better prepared than in the past!"

Students have responded positively, as they are more engaged with 3D animations of procedures that resemble the look-and-feel of a video game.

They are also able to better understand the internal workings of the brakes system, by being able to virtually "look inside" the equipment. Student satisfaction is evident from the consistently positive comments and feedback on the training. Most students have commented on their ability to better understand and grasp concepts using 3D visualization.

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The introduction of 3D virtual training materials to the maintenance training curriculum addresses the Army's requirement to train more efficiently, effectively, and economically. With virtual 3D training, students are learning faster, retaining more knowledge, and increasingly performing procedures correctly the first time. Also, training time has been reduced with no reduction in the Program of Instruction. With hundreds of entry-level Soldiers coming in on a weekly basis, the WVMS is providing better trained mechanics to keep essential equipment operational for Soldiers in the U.S. and abroad.

“These mechanics are better prepared than in the past!”

Contact info@ngrain.com for more details about this project.