

U.S. ARMY ENHANCES TRAINING EFFECTIVENESS AND SAVES MONEY WITH NGRAIN INTERACTIVE 3D MAINTENANCE TRAINING SOLUTION

BACKGROUND

In keeping with the Presidential Initiative for Technology, the U.S. Army Training and Doctrine Command (TRADOC) has multiple initiatives underway to increase the efficiency and effectiveness of its training programs. With this in mind, the Maneuver Support Center at Fort Leonard Wood, Missouri augmented two maintenance training courses with interactive 3D simulations.

CHALLENGE

The 3126 Caterpillar Engine is widely used in a number of tactical and combat vehicles by the U.S. Army such as the FMTV, Stryker, and DEUCE as well as a number of Army construction vehicles.

In 2004, it was identified that there were deficiencies in training on specific diesel engines as part of basic engine mechanics training as well as in the NCO training curriculum. Specific areas of concern were diagnostics and troubleshooting procedures. The Army estimated that improper diagnostics and troubleshooting resulted in considerable expense while also compromising reliability and availability of equipment in the field.

Responding to this need, one option was to purchase more live engines, allowing students more hands-on time for practice. This purchase, however, would be costly.

- Cost of additional live engines for use in training was estimated at \$1 Million
- Cost to sustain and maintain an engine, once embedded in the training area was \$50,000 per year

Despite the new purchases, students would still have limited time on the engines, resulting in a less than optimum learning experience. And students receiving training in the field would still not have access to the training engines.

Additionally, instructors identified that it is difficult to show and train on many functional characteristics such as firing order, fluid flow, air flow and other procedures with live engines. Given these limitations, the Army turned to technology-based solutions to achieve their training objectives at a lower cost.

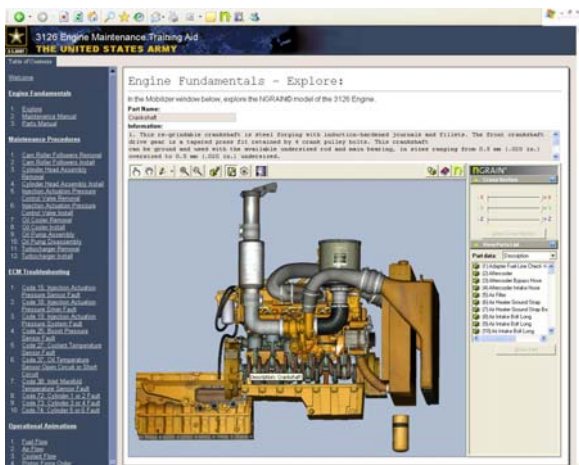


The FMTV is powered by the 3126 Caterpillar engine

SOLUTION

After careful review, the Army identified NGRAIN's interactive 3D solution as the most effective way to satisfy their training requirement. The Army used the NGRAIN solution to achieve a comprehensive training program:

- **Engine Fundamentals:** Students are able to fully explore the 3D engine by viewing parts information, examining each part on its own and within the context of the overall engine assembly, and assembling/disassembling and cross-sectioning the engine in real time. Providing functional information of each major component also provides a high value to the student and instructors.



Explore 3D engine in detail

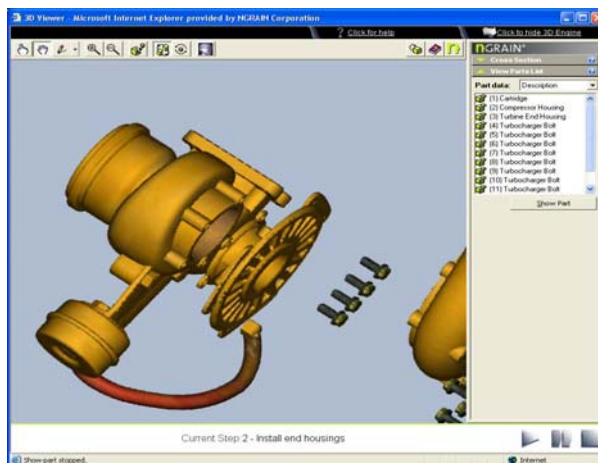
- **Engine Maintenance Procedures:** Students are able to watch 3D animations that illustrate each maintenance procedure. After watching, students can try the procedures themselves, fully disassembling and assembling the engine in real time.
- **Diagnostics and Troubleshooting:** When reviewing troubleshooting procedures, students are able to easily follow the various troubleshooting scenarios and procedures at their own pace. Technical manual information relevant to each procedure is also linked. Being able to visually follow the procedures plus immediate access to relevant technical manual information provides a unique perspective that instructors believe will enhance training in a way that they were not able to before.

IMPLEMENTATION

The NGRAIN Professional Services team worked with the Army instructors and subject matter experts to produce the 3126 interactive 3D maintenance solution:

- Created a 3D model of the 3126 engine and its sub-components, using digital photography, technical specifications, and subject matter experts to ensure accuracy.
- Used NGRAIN Producer (off-the-shelf software) to create procedural animations, add information to individual engine parts, and create hyperlinks to technical manuals and other relevant reference materials.

- Inserted the interactive 3D engine into a series of HTML pages, which contained maintenance procedures, troubleshooting, and diagnostics information.
- NGRAIN also conducted a training workshop with instructors on how to effectively use the NGRAIN software tools and the 3D Objects of the 3126 to help them achieve their teaching objectives.



Animation of disassembly procedure

RESULTS

Return-on-investment estimates indicate an initial savings of \$1.5 million for the Army. Additionally, by augmenting the physical training engines with the NGRAIN interactive 3D maintenance training solution, the Army is able to improve the effectiveness of training, especially in the area of diagnostics and troubleshooting.

Long term return-on-investment estimates include savings in mechanic repair costs. By training students to a higher level of skills proficiency, fewer unnecessary repair replacements will occur in the field, and turnaround times on maintenance and repairs will be shortened.

Contact army@ngrain.com for more details on this project.

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