Case Study –
Reducing Premature Failure of Parts with Interactive Virtual Training for Generator Operators

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Agenda

- Training Challenges
- Virtual Maintenance Trainers
- Case Study – 3kW Tactical Quiet Generator
- Conclusions

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Common Challenges in Training

- Some tasks cannot be trained, due to **expense** or **lack of access to equipment**
- Soldiers receive limited training before being deployed: task-based, **on-the-job training** is critical
- Training **budgets are limited**, yet training demand is increasing
- Total Package Fielding requires rapid and effective **New Equipment Training**

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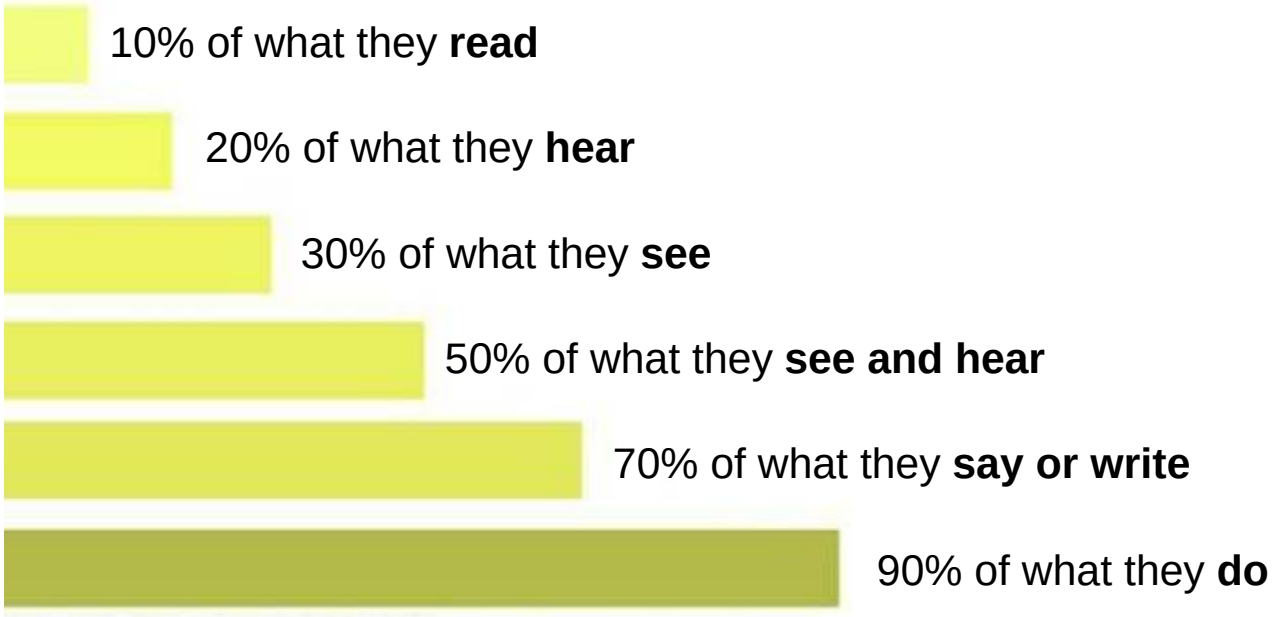
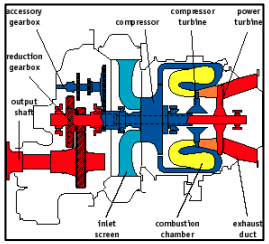
Learning Theory

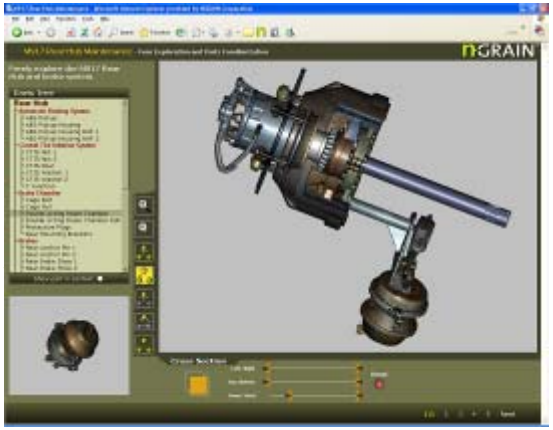
Students Remember



Source: Airbus/Journal of Civil Aviation Training (Issue 1, 2006)

Training Methods





Text	Multimedia	Interactive Virtual Maintenance Trainers	Hard Trainers	Live Equipment
✓Low cost	✓Low cost	✓Low cost	×High cost	
✓Easy to create and update	✓Easy to create and update	✓Easy to create and update	×Difficult to create and update	
✓Anytime, anywhere access	✓Anytime, anywhere access	✓Anytime, anywhere access	×Limited access	
×Low learning effectiveness	✓High learning effectiveness	✓High learning effectiveness	✓High learning effectiveness	

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Virtual Maintenance Trainers

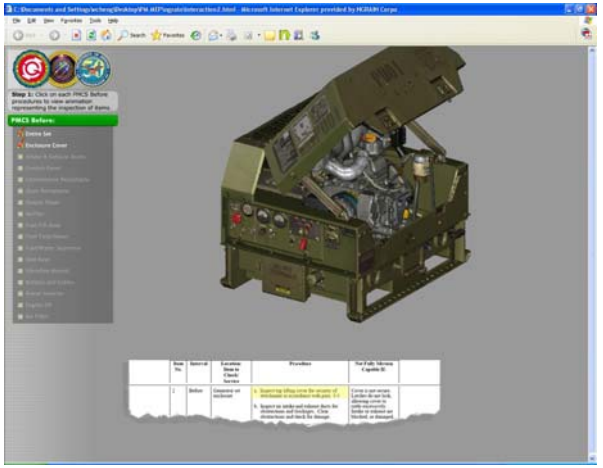
Virtual 3D equipment simulations to:

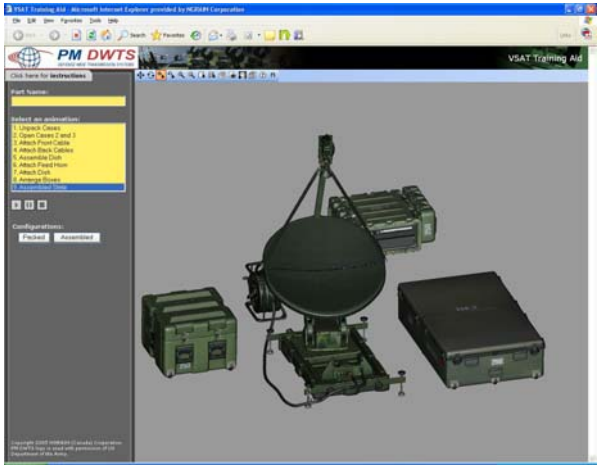
- *Familiarize*
- *Acquire*
- *Practice*
- *Validate & Test*

Proven ROI: Train 60% Faster

Benefits of Virtual Maintenance Trainers

- ✓ Let students learn from their mistakes, **safely**
- ✓ Let training take place **without the expense** of equipment
- ✓ **Reduce wear and tear** on equipment
- ✓ Enable **task-based, on-the-job training**
- ✓ Students are more engaged and **motivated**



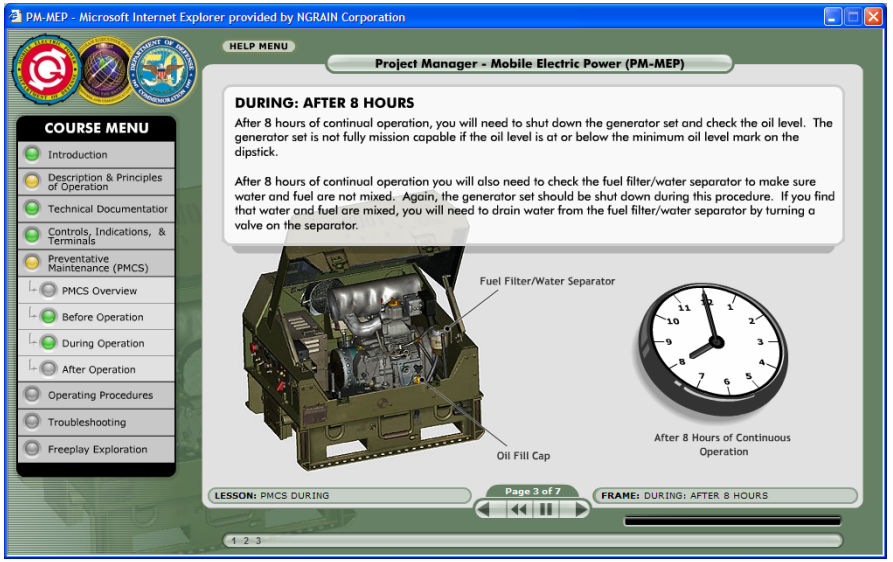


Case Study: 3kW TQG Operator Course

Challenge: Premature failure of generator parts due to operator error

Objective: Provide more effective refresher and sustainment training

Results: Reduced premature failure of parts



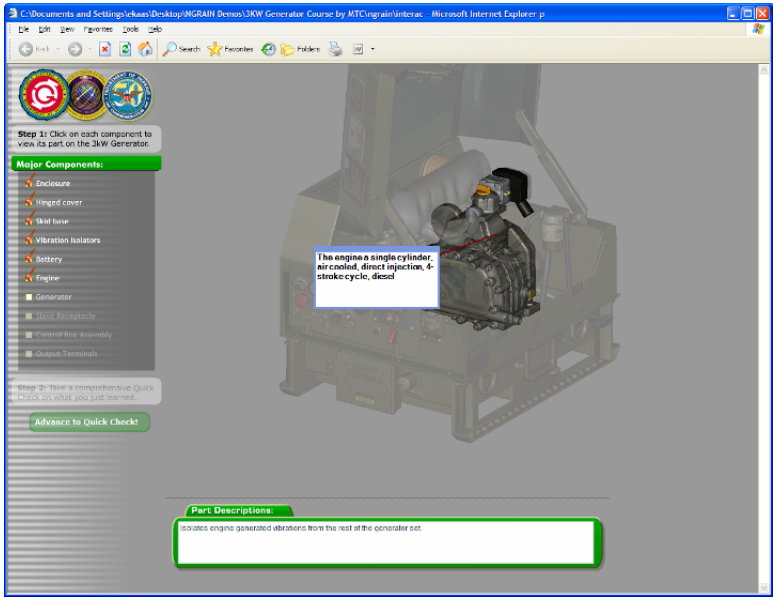
Case Study - Implementation

Based on Technical Manual

- Cross reference
- Follow the procedure

Visual & Interactive

- Engage students
- More intuitive explanations
- Validate & test



Computer Based

- Used by instructor
- Used by students
- Used by deployed soldiers to refresh or just in time training

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Case Study - Demonstration

Course Layout

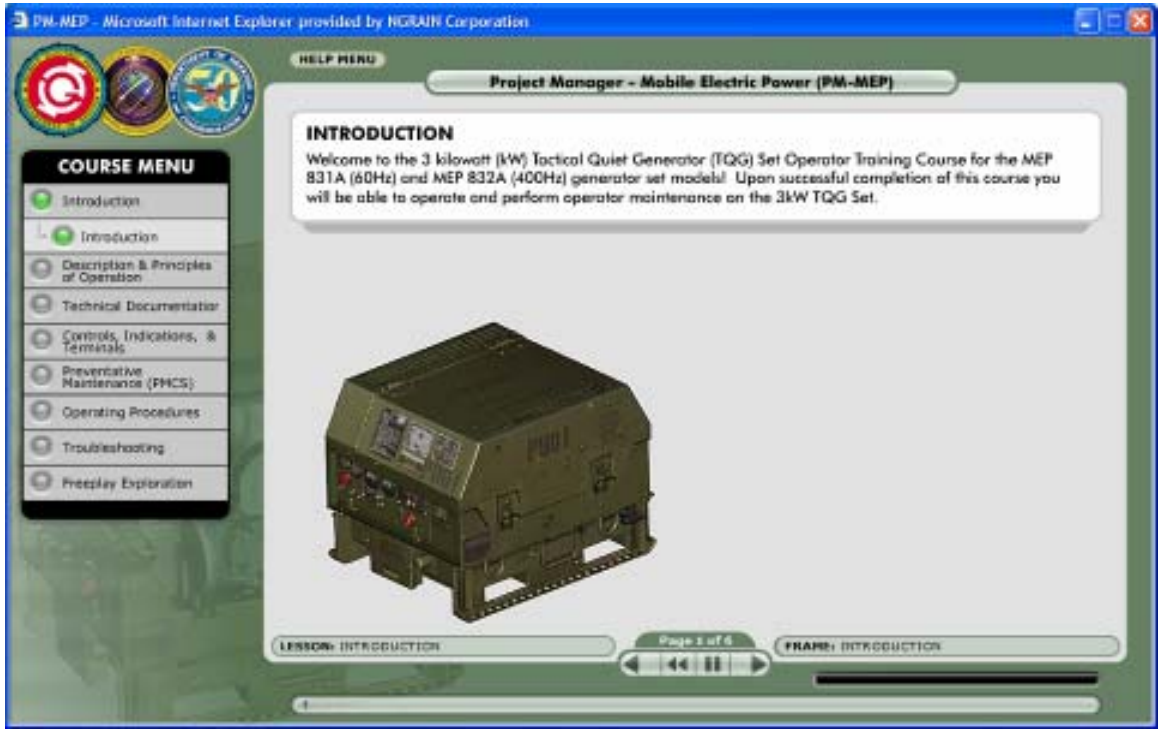
Component Familiarization

Controls

PMCS

Operating

Troubleshooting



Course Layout

PM-MEP - Microsoft Internet Explorer provided by NGRAIN Corporation

HELP MENU

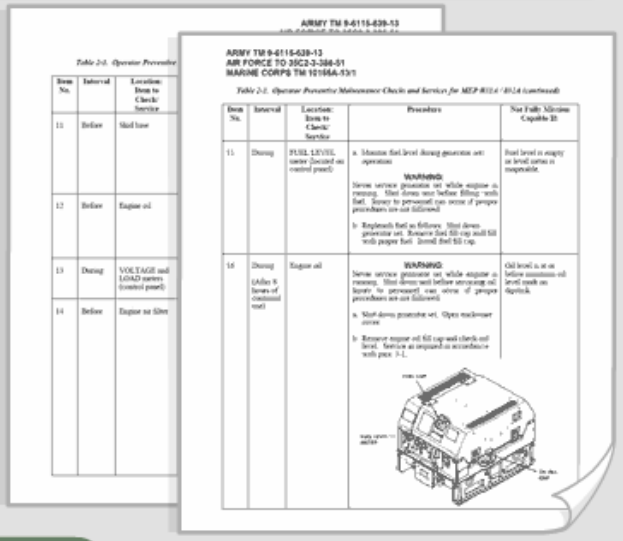
Project Manager - Mobile Electric Power (PM-MEP)

COURSE MENU

- Introduction
- Description & Principles of Operation
- Technical Documentatior
- Controls, Indications, & Terminals
- Preventative Maintenance (PMCS)
  - PMCS Overview
  - Before Operation
  - During Operation
  - After Operation
- Operating Procedures
- Troubleshooting
- Freeplay Exploration

INTRODUCTION

Welcome to During Operation lesson. This lesson reviews the PMCS procedures for during operation of the generator set. This lesson reviews the procedures you need to conduct while the generator set is running, Remember to refer to Table 2-1: Preventative Maintenance Checks and Services located in the Operator's Unit, and Direct Support Maintenance Manual for a complete guide to PMCS procedures to perform during operation of the generator set.



LESSON: PMCS DURING

Page 1 of 7

FRAME: INTRODUCTION

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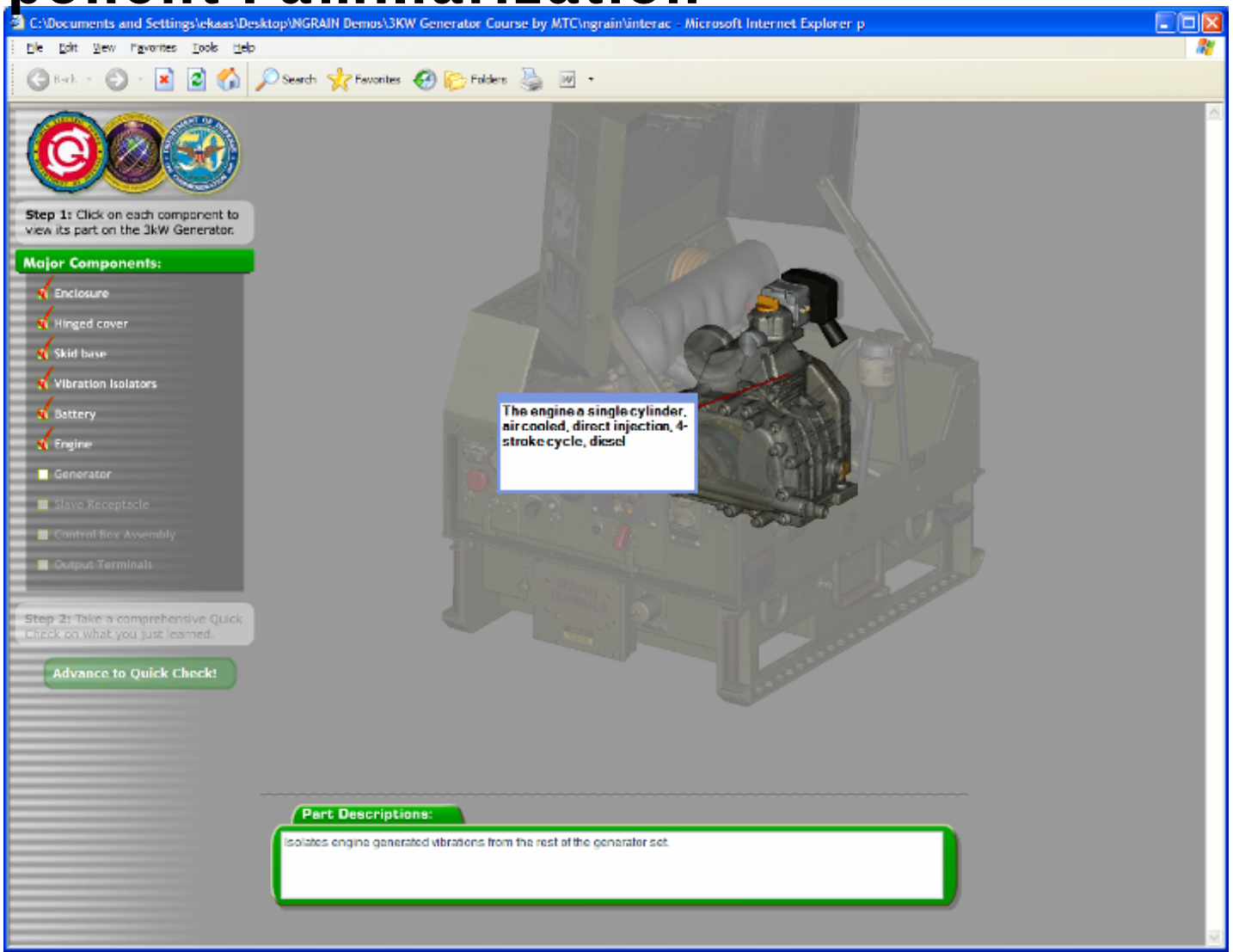
Component Familiarization



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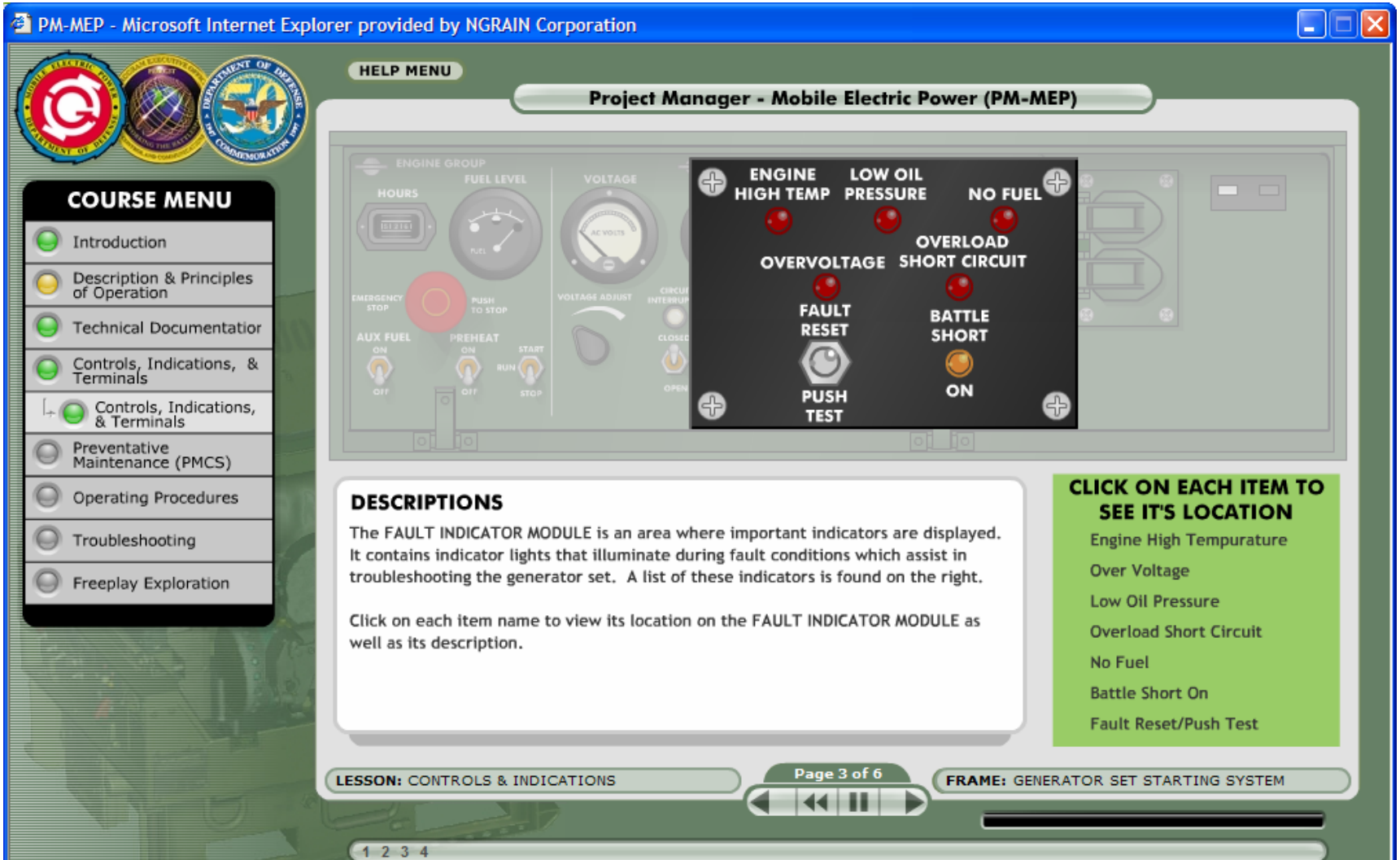
Controls, Indicators & Terminals



PMCS

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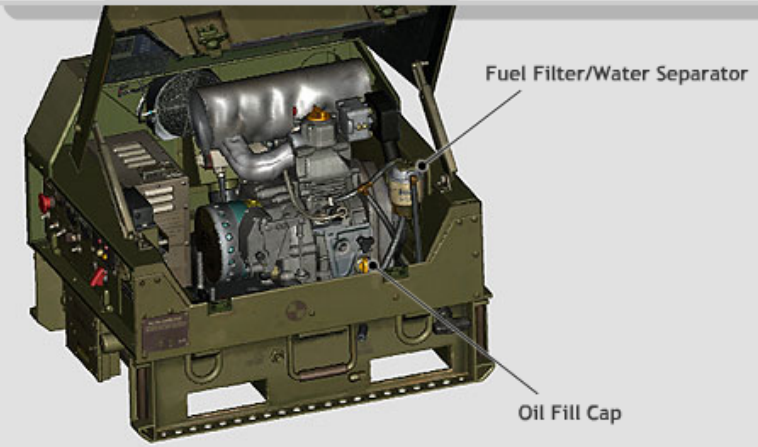
DURING: AFTER 8 HOURS

After 8 hours of continual operation, you will need to shut down the generator set and check the oil level. The generator set is not fully mission capable if the oil level is at or below the minimum oil level mark on the dipstick.

After 8 hours of continual operation you will also need to check the fuel filter/water separator to make sure water and fuel are not mixed. Again, the generator set should be shut down during this procedure. If you find that water and fuel are mixed, you will need to drain water from the fuel filter/water separator by turning a valve on the separator.



After 8 Hours of Continuous Operation

LESSON: PMCS DURING

Page 3 of 7

FRAME: DURING: AFTER 8 HOURS

1 2 3

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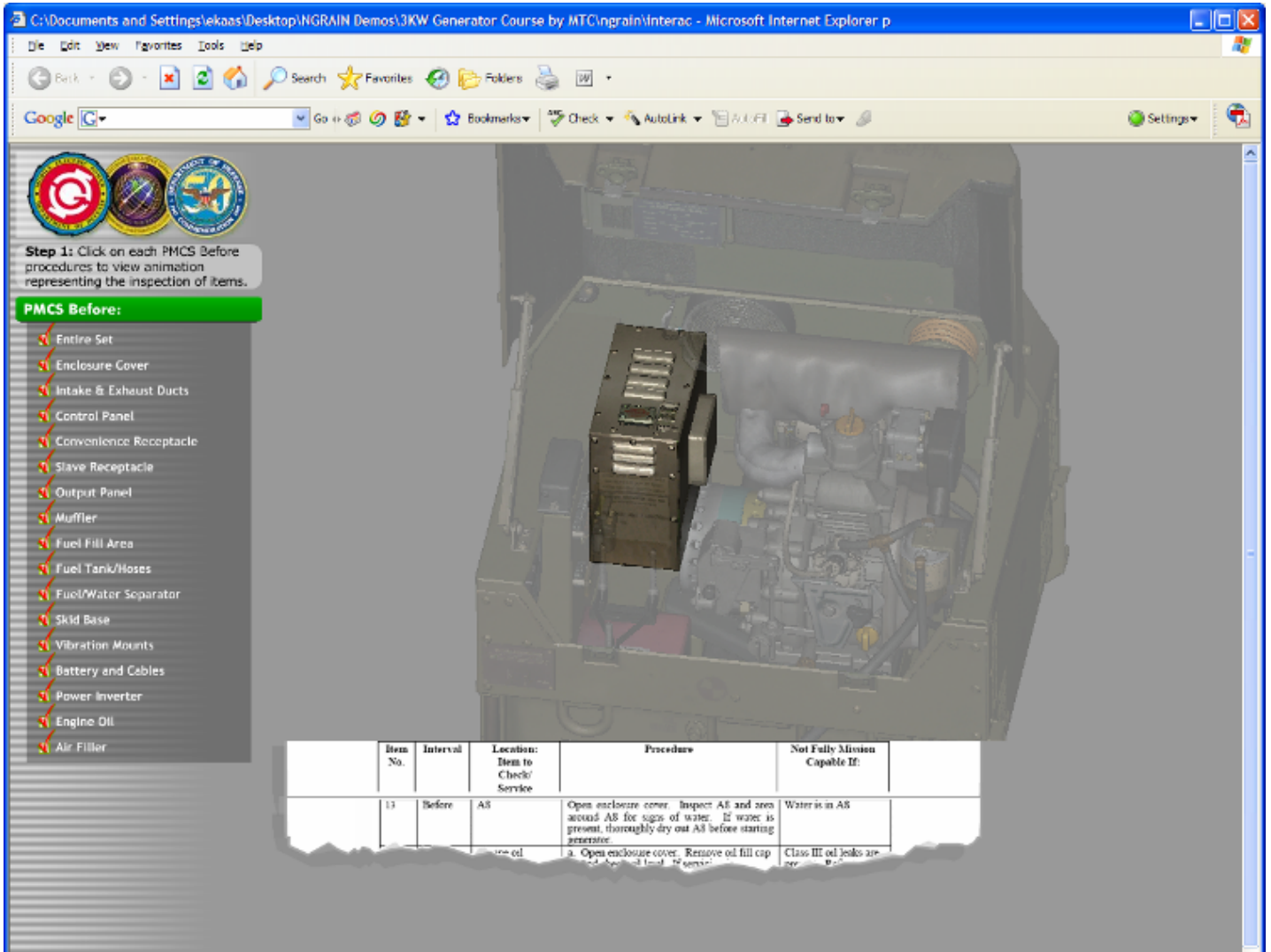
PMCS Procedure Illustration



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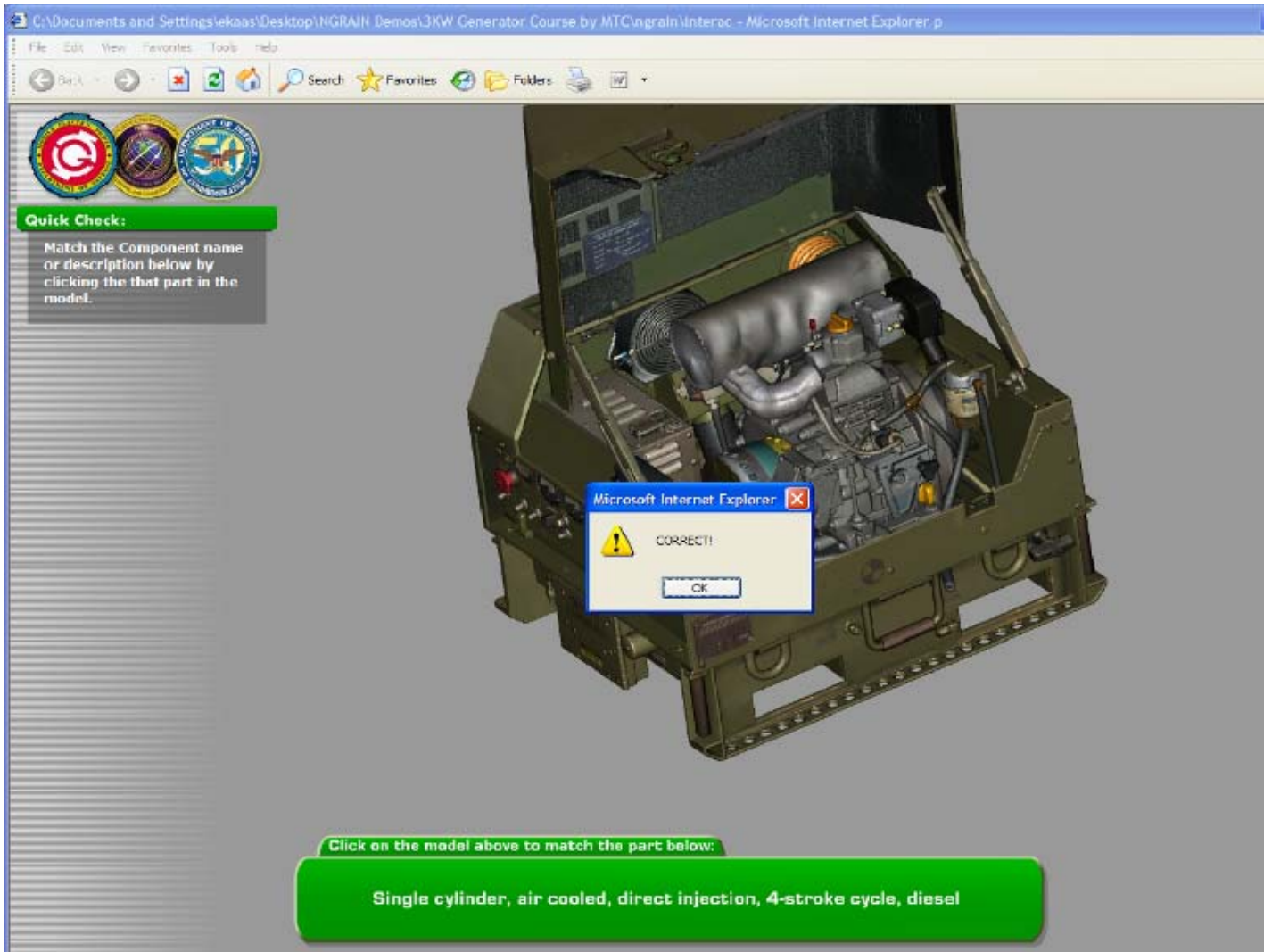
PMCS Practice



Operating & Troubleshooting

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HELP MENU

Project Manager - Mobile Electric Power (PM-MEP)

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- Troubleshooting
  - Procedures
- Freeplay Exploration

WHITE SMOKE

When the generator set is running you may see white smoke emitted from the engine. If you see white smoke, try the following procedures:

STEP 1:
First, check the engine oil level to see if it is too high. If it is too high, you will need to refer the trouble to the unit maintenance level so they can drain and service the engine oil.

STEP 2:
If the engine oil level is acceptable, check for water in fuel filter/water separator. If water is present, you will need to drain water from filter separator by turning the valve. (Refer to paragraph 3-8 of the Operator Unit and Direct Support Maintenance Manual for more detail.)

STEP 3:
If the fuel filter/water separator checks out to be fine, you should refer the trouble to unit level maintenance.

LESSON: PROCEDURES | Page 4 of 7 | FRAME: WHITE SMOKE

Conclusions

Interactive virtual maintenance trainers offer numerous benefits:

- Lets training take place even if there is no equipment available
- More effective for task-based learning objectives
- Operationally deployable
- Very suitable to address TQG training challenges

Thank you! Questions?

For more information:

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Case studies and Whitepapers:
www.ngrain.com

To order 3kW TQG Operator Course Computer-Based Training CD:
www.pm-mep.army.mil/logistics/TrgMat.htm