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THE NATIONAL SHIPBUILDING RESEARCH PROGRAM

Application of Industrial Engineering Techniques to Reduce Workers' Compensation and Environmental Costs - Deliverable I

U.S. DEPARTMENT OF THE NAVY
CARDEROCK DIVISION,
NAVAL SURFACE WARFARE CENTER

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DELIVERABLE I

COMPUTER BASED TRAINING MODULE DEVELOPMENT

Application of Industrial Engineering Techniques to Reduce Worker Compensation and Environmental Costs N8-96-3

Development of Computer Based Training (CBT) Module

1.0 Introduction

As a sub-task of the NSRP project, *Application of Industrial Engineering Techniques to Reduce Workers Compensation and Environmental Costs (8-96-3)*, the NASSCO Training Department and Environmental Engineering Department developed an interactive, computer based training (CBT) module. The objective of this sub-task was to provide computer-based training to shipyard personnel on environmental issues that impact the shipyard operation and production. The CBT module that was developed addresses the training requirements for the NASSCO shipyard personnel who are engaged in transfers of oil and bulk quantity hazardous materials over water. The contents of the CBT module are in accordance with the US Coast Guard regulations as specified in 33 Code of Federal Regulations (CFR) 154 and 156.

This report describes the logistics of how the CBT module was developed for the NASSCO shipyard.

2.0 Industrial Engineering & Environmental Management

The promulgation of more stringent environmental laws and regulations over the past two decades has prompted the shipbuilding and repair industry to train its employees on many environmental regulatory issues. As a result, the costs and resource allocation needs to train the shipyard employees on those environmental regulatory issues have increased significantly.

Industrial engineering human factor techniques have been applied to various shipyard production processes for many years. However, the application of industrial engineering techniques to the shipyard environmental management for a better cost control and increased productivity has been limited. In this sub-task, an interactive, computer-based training module was developed for training NASSCO shipyard employees to demonstrate the benefits of implementing industrial engineering techniques for better environmental management and cost control practices.

3.0 Current Environmental Training Approach at NASSCO

The NASSCO Training Department and Environmental Engineering Department offer a number of environmental training courses to employees as required by various regulatory agencies. All courses have an instructor-led, in-classroom-training format that relies on the efficiency of instructors. One of the disadvantages to this type of training format is that the students attend the training in accordance with the instructor's schedule that may be in conflict with the students' schedule. This is especially true for those students who require to be re-trained to stay compliant with the federal or local regulations. The impact on the production schedule and man-hour can be staggering: it has been estimated that the cost to provide this type of training can range from $100 to $200 per hour.

4.0 The Person-In-Charge Training

The NASSCO employees who are engaged in the over-water transfer of oil and bulk-quantity hazardous materials are required to be trained per the US Coast Guard requirements as specified in the 33 CFR 154-156. These employees are designated as Persons-In-Charge and must be trained on an annual basis. The NASSCO Environmental Engineering Department chose the PIC training as the topic for which the CBT be developed. Approximately 30 NASSCO PIC's receive training annually on the PIC requirements.

The PIC training module that was developed under the NSRP project number 8-96-3 was used for developing the CBT module text. The text was written to be specific to NASSCO operations. Because of NASSCO's multi-cultural workforce whose first language may be other than English, a special attention was paid to the text write up.

5.0 Developing the CBT Module

5.1 Computer Hardware Requirements

An IBM compatible personal computer with a Pentium-233 processor and the Windows NT operating system was used for authoring the CBT module. The computer has a 64-MB of RAM, a 6-GB hard drive, and a Diamond Monster Video Card with 8 MB. In addition, a Smart & Friendly 426 External CD Re-Write was used.

5.2 Computer Software

Two authoring software programs were used for developing the CBT module.

5.2.1 Macromedia Authorware Studio Suite

The Macromedia Authorware Studio Suite software package was chosen as the main authoring tool. The suite includes Authorware, Director, Xres, Backstage, Sound Editing software. Authorware is the number one selling instructional authoring software. It has an automatic conversion feature for the World-Wide-Web. Macromedia offers many outside training courses. Also, help groups are available for novice instructional designers.

5.2.2 *Designer's Edge*

Designer's Edge is a course writing tool from Allen Communication. It allows the course author or trainer step-by-step thorough course writing procedures to design an instructional program. Using Designer's Edge may allow up to 30% reduction in the CBT course authoring time.

6.0 NASSCO Environmental PIC Training: The Final Deliverable

The final deliverable of this sub-task is a CD-ROM containing the PIC CBT module titled *NASSCO Environmental PIC Training*. The CBT module is comprised of 12 sections including the student exam. The CBT module contains audio, video, text, and graphic files. It may take a student approximately two hours to thoroughly go over the module; however, the length of completion time depends greatly on each student's level of subject matter knowledge, English proficiency, computer proficiency, etc.

This CBT module was reviewed by the California State Lands Commission to ensure the accuracy of the contents.

7.0 Potential Benefits

There are many potential benefits to be realized from using the PIC CBT module: Students can schedule the training at their own convenience without impacting the NASSCO production schedule or manpower. Students can work at their own pace to gain a thorough knowledge of the subject matter. Because the students do not depend on the instructor's training efficiency, the training being provided is consistent. The CBT module is cost effective because it requires no instructor.

The initial investment to purchase the software programs is required for developing CBT modules. However, the rate of return on the investment is expected to be high. NASSCO expects to start utilizing the developed PIC CBT module in the coming weeks. NASSCO also expects to develop and use other environmental CBT modules to meet its environmental training requirements.