Dynamic
Positioning
Committee

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TRAINING SESSION

Dynamic Positioning & Integrated Control Systems Technician Training

Keeping up with New Technology

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ABSTRACT

Today's sophisticated electronic equipment has increased the need for qualified technicians. Dynamic Positioning Systems have become more automated, and allow integration with other systems such as power, vessel management, and propulsion. Technicians trained in basic system operation, serial communication, and troubleshooting, will be better able to maintain D.P. systems and reduce "down time". This paper will focus on technical training center technician training, the objectives, program content, as well as onboard training, and refresher training programs.

INTRODUCTION

The electronic industry's technological advancements in systems such as Dynamic Positioning (DPS) have created the need for qualified technicians. Therefore, the need to train personnel is vital in the process of keeping up with technology.

Electronic Control systems have become more sophisticated and automated due to customer demand. The Webster dictionary defines "Automation" as "designed to function without human intervention". This causes a problem since automation reduces key positions, and fewer personnel are needed to operate and maintain these systems. Manufacturers produce these systems with simplicity in mind, but many look at automation as job replacement.

We need to look at the bigger picture; evolution of this new technology is not waiting for anyone. Companies willing to stay competitive must keep up with this evolution. Today's systems have a level of automation built in that can be seen from engineering to the ships-bridge. As automation and system sophistication go hand in hand, some companies are having a difficult time locating and hiring qualified individuals with the basic understanding of these new electronic systems.

Training is the answer to this dilemma. The training process, from basic system familiarization courses to on-the-job training, takes time. Training may be considered time consuming. But, when problems arise or system malfunctions occur, having well trained technicians that can analyze the problem and rectify the situation quickly, is time well spent.

A Company who invests in training will be ahead of the competition in maintaining a pool of qualified technicians. Knowledgeable technicians who have confidence in their abilities to repair system problems will save money and down time. This is a win win situation for the company and the technician.

TRAINING PROGRAMS

There are three levels of training programs: Training Center, Onboard Training, and Refresher Training. Training center programs are prepared to meet customer demands from system theory to maintenance requirements and troubleshooting. The other levels of training are designed to maintain a level of competence for the technicians.   Each level of training the technicians should obtain the knowledge of a specific objective that will help understand the operation and the repair requirements of the system.

TRAINING CENTERS

Location of the training center is not as important as the training center's accomplishing its course objectives. This could easily be validated by receiving input from technicians that have attended the course, or by the training center providing a comprehensive analysis report of the technician's that have attended the course.

Technical training centers are unique in the sense that the necessary equipment is provided, from personal computers to simulator systems, in order to accomplish the course objectives. Technicians can best understand theory of operation and hardware limitations by troubleshooting faults created on these simulated systems, allowing them to put into practice what they have learned. The "hands-on" application and basic knowledge or understanding of electrical, electronic, and computer theory is the key to the success of any technical training course.

The contents covered in a technical training course for Dynamic Positioning System should include, but is not limited to, the following sections:

- **Introduction & System Theory**
    - Definitions and system terms
    - Controlled functions of the system
    - Elements affecting the system.

- **Hardware Architecture & Description**
    - Hardware specifications and applications
    - Limitations of hardware and system
    - Applicability of the system to the type of operation required.

- **Sensors** (other units interfacing with the system)
    - This section covers the supporting units required by the system to perform its function and each sensor particulars.

- **Signal Processing & Networking**
    - Types of serial communication (computer to signal processor unit)
    - Data conversion (analog / digital)
    - Types of network applicable to the system (new development).

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- **System Configuration**
    - Major components applicability and responsibility
    - Configuration of components and other integrated systems
    - Synchronization of the system (sharing information).

- **Modes of Operation**
    - This section covers in detail all modes of operation. (Hold heading & hold position) With the aid of simulators, students apply what they've learned, from theory to operation.

- **System Alarms**
    - This section interprets the many alarms generated by the system and discusses the proper procedure required to prevent total system malfunction.

- **Safety**
    - This section emphasizes personal responsibility for safety and discusses the proper action needed in the event of an accident.

- **Maintenance**
    - This section discusses and demonstrates, with the aid of the simulator, proper maintenance practice and periodic maintenance requirement for this particular system.

- **"Hands – On" Troubleshooting**
    - This section allows the technician the opportunity to experience possible problems and determine the best way to repair them. Upon completion of each exercise, the instructor and the students critique the exercise and determine other possible solutions or recommendations in areas of troubleshooting that will save down time. This section also gives the instructor time to evaluate and reemphasize any areas that would be helpful to the technician in understanding the system.

- **Comprehension Analysis**
    - This quiz is used to measure the level of knowledge after the completion of the course. It also helps the instructor modify course standards or objectives if needed.

The course outlined above is an example of some of the areas that need to be covered to best prepare a technician on a highly sophisticated system such as Dynamic Positioning.

ONBOARD TRAINING

Companies convinced that training conducted solely onboard can easily replace the training centers do not understand the basic principle that is provided by training centers. This principal is the foundation that introduces a technician to a complex system such as DPS. The initial training conducted at a training center is vital for all other training programs such as onboard training. Onboard Training programs have to be developed and incorporated to maintain the level of expertise required of the technicians. This training should be broken down into two areas: On-the-Job Training and Cross-Training

On-the-Job Training - Organizations that provide training or system review sessions, designed to emphasize objectives covered in the training center, will maintain technician focus on the system in the event of an alarm or system malfunction. This time could be as little as one hour per week during shift change or during a slow period during the day.

On-the-job training can also be applied to employees seeking a technical career within your company. Once they have a basic understanding of the system they should undergo professional training provided by a qualified training center.

Cross Training – is training conducted between technicians. Every technician is specialized in a specific system or technical area. The sharing of this information or technical expertise through the use of cross training can contribute to a teamwork environment. This teamwork environment is a goal that all supervisors are looking for, getting the best of all technicians on hand through cross training is the best tool you have to accomplish this goal.

Cross training can also be between operator and technicians. This training focuses on the responsibilities and the communication practices required between the Operator and the Technician. This is primarily important when interpreting alarms. When an alarm occurs on the system, miscommunication between these personnel could cause misdiagnosing of this alarm. Good communication practice such as discussing the events that led up to this alarm could save in down time.

REFRESHER TRAINING

Sophisticated systems such as DPS do not have a high failure rate. Operators and technicians may go months or years before seeing a system malfunction. Taken this fact into consideration, operators and technicians are required to partake of a refresher-training program.

The aviation community provides a good example of the importance of a refresher-training program. Key personnel go through extensive refresher training, which includes many hours in a simulator. This requirement is designed to prevent accidents and to maintain the individuals focus on the system. This practice is the only way to have technicians and operators see failures that they normally would not see, due to system reliability. However, the goal of refresher training is to prepare and test individuals on their decision-making skills and reaction time in the

event of system malfunction, preventing the possibility of equipment damage or personnel injury**.**

Operator's and Technician's that conducted their original training between three to fiv
ago need to be reintroduced to system theory, upgrades, safety considerations and possibly new procedures that were developed during that period. Training center refresher training courses designed for technicians provides scenarios not normally seen and helps breakaway from routine troubleshooting.

Regardless of the type of training taken, each individual should take pride in what they do. Good technicians constantly evaluate possible system malfunction circumstances, asking **"what if"** situations, preparing themselves when time is crucial. This is a state of mind that is required to do the best possible job. Take into consideration where this job may take a technician, possibly in the middle of the Atlantic Ocean, where resources may be limited and stress is high, proper preparation will limit down time.

SUMMARY

Electronic technology advancements are updated on a daily basis. Keeping up with this technology requires properly trained individuals just to stay competitive.

This paper has demonstrated the basic areas of training required for your technicians and the importance of each level. But one question still comes to mind. **Do you have the proper allocation of technicians on board?** Considered the amount of systems found onboard and the flexibility automation gives you, it's evident the technician responsibility has increased.

Management must be aware of the proper manning level, but limited resources of well training technician have created a problem in this area. Some managers have developed a repair priority list on all the systems found on board their vessel. This list works on two principals:
One - it gives a clear priority for the technician of which system must be repair first in the event of multi system malfunction.
Two - it gives management a clear priority of systems that require special consideration, such as Dynamic Positioning System. With this information managers make the necessary arrangements and send individuals for training.

For some companies having a trained technician aboard is just a security blanket. Regardless of the problem or system malfunction, normal procedures will be to call the field service engineer as soon as the problem has been detected. The travel time of the field service engineer to locations is the time the technician has to repair the system. Taking into account where your company operates, to some extent, this practice could save in down time. However, a well-trained technician aboard your vessel, who is familiar with the system can communicate with that field service engineer through radio/satellite and solve the problem in a shorter time, thus reducing cost.

Technology advancements make life easier for some, but the system sophistication makes life complicated for others, especially the individual responsible for maintaining them. The

realization that automation will replace some jobs, is a fact that will not go away, but on the other hand, system sophistication has created the need for more qualified (trained) technician.

The training requirements are many, from the training centers through to follow up training. Technicians need the support and encouragement from the company to do the best possible job and in turn reduce down time.

Technical training should be viewed as a necessity not a waste of time.