U.S. NAVY'S PLASTICS WASTE EDUCATIONAL EFFORTS

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ABSTRACT

The U.S. Navy is responding to the at-sea plastics discharge prohibition in the Marine Plastic Pollution Research and Control Act with a program that includes new shipboard solid waste management equipment, changes in the supplies taken on board, and educational efforts.

Basic strategy of the Navy's plastics waste education program focused on motivating the entire chain of command, ships' officers, and ships' crews by providing justification for and information about the new requirements.

Before designing an effective shipboard plastics waste management program, it was necessary to learn (1) the nature and quantities of plastics waste on Navy ships, (2) feasible shipboard plastics waste management practices, and (3) sailors' attitudes about plastics pollution control. The Shipboard Plastics Waste Reduction Demonstration Project gathered this information on seven ships. Then, using recommendations from an ad hoc advisory committee on plastics and actual experiences on the demonstration ships, the Navy designed an educational package to send to all Navy ships.

The Navy's plastics education package includes guidance material, videotapes, posters, and general literature. To educate the ships' officers, a ship's guide contains chapters on (1) problems caused by plastics in the oceans, (2) Navy

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requirements, (3) essential elements of a successful shipboard program, (4) example approaches used on the demonstration ships, and (5) general information about related issues. Appendixes to the guide include lists of common plastic and substitute nonplastic items, sample ship instructions to implement the program, descriptions of other materials in the package, and Navy points of contact for further information. To education the crew members, a 10-min videotape explains the problem, the Navy's program, and appropriate shipboard actions. A series of 30-sec videotapes and written announcements highlight specific aspects of the problem and the program.

Preliminary responses to the education package from Navy ships are very positive.

INTRODUCTION

Impetus for Navy's Plastics Program

Recent and unexpected national regulatory initiatives caused the U.S. Navy to quickly develop and implement shipboard plastics waste management programs. The Navy anticipated more stringent international regulations affecting solid waste disposal at sea, but not a prohibition on plastics discharge.

Annex V of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships (MARPOL), prohibits disposal of all plastics, and restricts discharges of all types of solid wastes, into the sea from ships. Public vessels are exempt from Annex V restrictions but are expected to comply to the extent possible. However, the U.S. Congress, in passing the U.S. Marine Plastic Pollution Research and Control Act of 1987 (P.L. 100-220), made the plastics discharge prohibition apply to the U.S. Navy. The Congress is requiring the Navy to comply within 5 years or demonstrate why it cannot.

For decades the Navy has worked to eliminate the discharge of floating marine debris from its ships, and for the last 5 years, has been developing suitable shipboard equipment for pulping, compacting, and processing all solid waste (Alig et al. 1990). The equipment will convert all shipboard solid wastes to acceptable forms for overboard disposal at prescribed distances from shore. However, plastics waste would have been processed along with other solid wastes, so the new requirement to eliminate plastics waste disposal at sea created an unexpected and difficult challenge.

Ad Hoc Plastics Advisory Committee

The Navy formed an ad hoc committee on plastics to develop recommendations for reducing plastics waste discharge from Navy ships, and in October 1988, the committee presented its report to the Assistant Secretary at a Washington, D.C., news conference. The report contains 42 recommendations covering 4 areas: supply system, technology, ship operations, and education.

The Navy's shipboard pollution abatement program was already addressing most of the committee's technology recommendations as part of the shipboard solid waste management program. The recommendations in the areas of the supply system, ship operations, and education, however, embodied major changes in Navy practices. Nevertheless, the Navy began implementing many of the recommended actions to help reduce plastics discharge at sea.

Following are the six recommendations made in the area of education:

1. Disseminate information on the plastics problem and the Navy's plans to all levels in the Navy.

2. Develop education materials for ships, supply centers, and procurement offices.

3. Use an education package composed of several key elements on every Navy ship.

4. Assess effectiveness of education efforts through a survey.

5. Use the Navy's environmental award to recognize outstanding ships for their efforts to reduce plastics waste.

6. Sponsor shipboard contests on plastics reduction methods.

Navy Actions

The Navy has already taken significant actions to control plastics pollution at sea. As examples, fleet commanders ordered all ships to separate plastics from nonplastics waste on board and return the plastics waste to port for disposal or recycling. Supply centers have replaced plastic items with nonplastic ones on ships wherever possible. The Chief of Naval Operations office sent a plastics education package to all ships. This paper describes the Navy's initial efforts to educate ships' officers and crews about the new requirement to eliminate plastics waste at sea.

GUIDING PRINCIPLES

The key to success for a new Navy program is to motivate the chain of command and the sailors to participate fully. But in the case of the plastics waste program, the entire chain of command also had to support the program, both financially and authoritatively.

Before the top echelons of the Navy's chain of command would impose such drastic measures as storing wastes on Navy warships, they needed evidence showing shipboard plastics waste programs to be feasible, effective, and safe. Therefore, we had to assess the feasibility, effectiveness, and safety of potential shipboard plastics waste management practices before we could propose a program concept that the chain of command would support.

The program needed careful planning and coordination among many diverse Navy organizations (e.g., Office of the Chief of Naval Operations,

Fleet Commands, Naval Sea Systems Command, Naval Supply System Command, and Navy laboratories). Even then, edicts and emotional appeals do not ensure a successful program. For drastic changes in shipboard waste management practices, a variety of motivation techniques would be needed to get full cooperation on ships. Some officers and crew would be sufficiently motivated by direct orders. Others might respond to the military benefits of new procedures. Sound explanations of the reasons for new requirements would suffice for some. Still others would get personally motivated by appealing to their sense of pride or the need to protect wildlife.

Our guiding principles, then, in developing the educational program were to invoke as many response stimuli as we could.

EDUCATION OF NAVY PROGRAM MANAGERS

Successful reduction of plastics discharge from Navy ships requires two educational efforts. One is educating the Navy chain of command about what shipboard practices are feasible and effective. The other is educating ships' officers and crews about the new practices. To achieve the first step, the Navy needed to learn (1) the nature and quantities of plastics waste on Navy ships, (2) feasible shipboard plastics waste management practices, and (3) sailors' attitudes about plastics pollution control. In 1988, the Navy's Shipboard Plastics Waste Reduction Demonstration Project began collecting this information.

During the demonstration project, Navy researchers traveled on seven ships to quantify shipboard plastics waste, and evaluated prototype equipment and plastics waste management procedures. They sorted and inventoried all plastics waste generated on board. On two ships they evaluated Navy-developed prototypes of a trash compactor and a waste pulper. Other researchers surveyed the crews' knowledge about the plastics problem.

The preliminary conclusions from the demonstration project regarding an education effort are the following:

- Sailors are generally receptive to the major new requirement to separate and store plastics waste on board, once the problem with plastics in the oceans is explained to them.

- The mission, size, crew density, and operating characteristics of different ships differ so much that a single set of prescribed plastics waste management procedures is not appropriate for all ships.

- Ships prefer to find their own approaches to meeting the requirements, i.e., be told what to do, not how to do it.

EDUCATION OF SHIPBOARD PERSONNEL

Development of Education Package

Initially, we planned to prepare a prototype educational package and test its effectiveness on several demonstration ships before sending it to

all Navy ships. However, the Commander of the Atlantic Fleet took a personal interest in the plastics problem and pushed for faster implementation of shipboard programs. His staff prepared instructions for ships to retain plastics waste on board to the extent practicable. He wanted an educational package sent to ships before he would issue the new instructions. Consequently, we had to assemble educational materials quickly without knowing exactly what shipboard procedures were feasible and what educational materials would be effective on ships.

Our basic strategy for the educational package targeted two audiences on ships: executive officers and crew members. We prepared a ship's guide and a new videotape, and supplemented these two key items with available literature, posters, brochures, and videotapes.

The ship's guide serves as a compilation of useful information about the new requirements and suggestions for implementing a shipboard program. To allow ships' officers and crews to find their own ways of meeting the new requirements, the material was presented as a guide, not an instruction.

Because closed circuit television is the prime source of news and entertainment on ships, we believed that videotapes would be the best way to influence and communicate with sailors. Therefore, the Navy produced new videotapes that focused specifically on the Navy's role in the plastics problem. As a general overview, we prepared a 12-min tape that covers all aspects of the problem and the Navy's program. To add authority and credibility to the new requirements, the Vice Chief of Naval Operations made a 3-min statement on videotape. To keep the issue visible to the sailors and reiterate the theme of the plastics program, we produced a series of 30-sec tapes that could be shown on board between movies. For variety, we included in the package existing videotapes produced by other organizations.

Contents of Education Package

The Navy's plastics waste educational package that was sent to all ships included the following items.

- "Ship's Guide to Recent Navy Initiatives for Shipboard Solid and Plastics Waste Management" (U.S. Navy).
- Videotapes in Beta and VHS formats with six selections:
  - "Plastics At Sea, More Than a Litter Problem" (12 min, U.S. Navy).
  - Statement by Admiral Edney, Vice Chief of Naval Operations (3 min).
  - Eight 30-sec public service-type announcements (U.S. Navy).

- Navy Broadcast News segment on the plastics problem (7 min).
- ABC News excerpt on ocean pollution (3 min).
- "Trashing the Oceans" (7 min, U.S. National Marine Fisheries Service).

- "A Citizen's Guide to Plastics in the Ocean: More Than a Litter Problem" (Center for Environmental Education, Washington, D.C.).
- Three posters:
  - "Don't Splash Navy Trash--Others Can Pick It Up" (U.S. Navy).
  - "Our Ocean Is Drowning" (U.S. National Marine Fisheries Service).
  - Photograph of large plastic bag of trash with narrative (Center for Environmental Education, Washington, D.C.).
- "Our Water Planet is Becoming Polluted with Plastic Debris" (brochure prepared by U.S. National Marine Fisheries Service).

The Navy's videotape "Plastics At Sea, More Than a Litter Problem" explains the problems caused by plastics in the oceans, the Navy's overall program for shipboard solid and plastics waste management, and what actions are needed by each ship and crew member. The tape is narrated by an actor in an enlisted man's uniform and contains footage of healthy marine life, entangled animals, Navy ships, shipboard scenes, and computer graphics. To appeal to sailors, segments of the Huey Lewis videotape "Perfect World," showing his band singing in a huge garbage dump, appear throughout the tape.

The ship's guide is similar to a citizen's handbook, except that it contains information applicable to Navy ships and the Navy's plastics waste program. The guide is approximately 50 pages long, with 6 chapters and 9 appendixes. Chapter 1 (Introduction) briefly describes the problems caused by plastics at sea and the international and national regulations restricting disposal at sea. Chapter 2 (Navy Requirements) explains the major changes needed in shipboard solid waste management. Chapter 3 (Essential Elements of Successful Shipboard Program) emphasizes that a shipboard program needs comprehensive operational changes, leadership, crew education, constant reinforcement, and clear definitions of responsibilities. Chapter 4 (Example Approaches Used on Demonstration Ships) provides suggested procedures for ships to use in their own shipboard plastics waste program, based on successful and unsuccessful approaches used on the demonstration ships. Chapter 5 (Medical Wastes) describes the new requirements for managing medical wastes on board. Chapter 6 (Status of Related Issues)

addresses three topics related to the plastics program: degradable plastics, shipboard incinerators, and commercial products.

The nine appendixes are a collection of miscellaneous items to help executive officers develop their ship's program. We provided lists of common plastic items on ships and the available nonplastic substitutes. Brief synopses of information about the plastics problem, sources of marine debris, legislation, and the Navy's program are included as sample "Plan of the Day" announcements for executive officers' use in keeping the program visible to crews. Included also are example ship instructions for implementing a shipboard program and an example message report for reporting any necessary plastics discharge at sea. Other appendixes describe the contents of the educational package and give Navy points of contact for additional information.

PRELIMINARY OBSERVATIONS ON EFFECTIVENESS OF PACKAGE

The Navy sent complete educational packages directly to all ships in the U.S. Fleet in early 1989. Preliminary responses to the education package are very positive. The combination of useful information and multimedia motivational techniques in the package seems appropriate for Navy ships. Each item in the package seems useful for one or more purposes. However, the two items specifically prepared by the Navy for the education package (i.e., ship's guide and videotape) are the most valuable.

The Navy will continue its shipboard plastics educational program and extend it to shore facilities. Plans to modify the videotape and distribute it to shore facilities are ongoing. The future direction of the program will depend on the success of the initial effort and the need to modify the program.

CONCLUSIONS

The requirement for U.S. Navy ships to separate and retain plastics waste on board is so new and the educational packages were distributed so recently that any conclusions about the effectiveness of the program would be premature. However, from our experiences so far, we make the following observations:

1. Sailors generally respond positively to the plastics waste program and the educational materials. We believe the general environmental awareness and young age (average age is about 20 years) of Navy sailors are major factors affecting the positive response.

2. High quality videotapes are an effective means for communicating with shipboard audiences. However, useful guidance material about specific procedural details must accompany the videotapes.

3. Attention by the entire chain of command is needed for successful program implementation.

4. Edicts, emotional appeals, and good educational materials do not ensure successful shipboard plastics waste programs. The program must be carefully planned, coordinated, and implemented. Proposed new plastics waste requirements must be first proved feasible, effective, and safe on ships for the program to succeed.

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