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Project between the  
U.S. Environmental  
Protection Agency  
and Industry

# design<sup>FOR</sup> THE ENVIRONMENT

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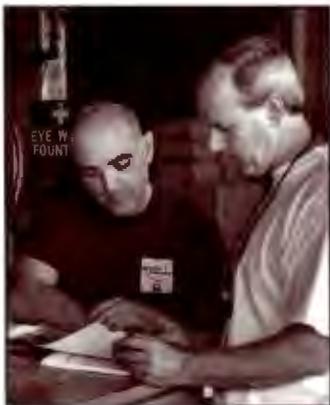
Environmental Management System Bulletin 1

## BULLETIN HIGHLIGHTS

- Benefits of an EMS based on DfE concepts
- Real-world examples of benefits from the Acushnet Rubber Company

## ALSO IN THIS BULLETIN

- What is an EMS?
- Facility profile of Acushnet



**Tony Mello and Ray Lelièvre of Acushnet Rubber Company discuss their facility's EMS.**

## Using Design for the Environment Concepts in Your EMS

An Environmental Management System (EMS) can provide a company with a systematic way to improve its operations for better environmental performance. While an EMS supplies the basic management framework, EPA's Design for the Environment (DfE) Program provides guidance and tools to help companies achieve continuous environmental improvement. The DfE approach encourages companies to consider environmental and human health risks in all business decisions. In addition, it encourages companies to evaluate cleaner processes, technologies, and workplace practices.

### Why Establish a DfE-Based EMS?

A DfE-based EMS provides a company with opportunities to go "beyond compliance" and save money. The DfE approach can help a company meet the objectives of its EMS by promoting the evaluation of cleaner production alternatives. By implementing these alternatives, a company can continuously improve its environmental performance.

In addition, an EMS encourages the systematic evaluation of each area of the company's operation. An EMS can provide the following benefits:

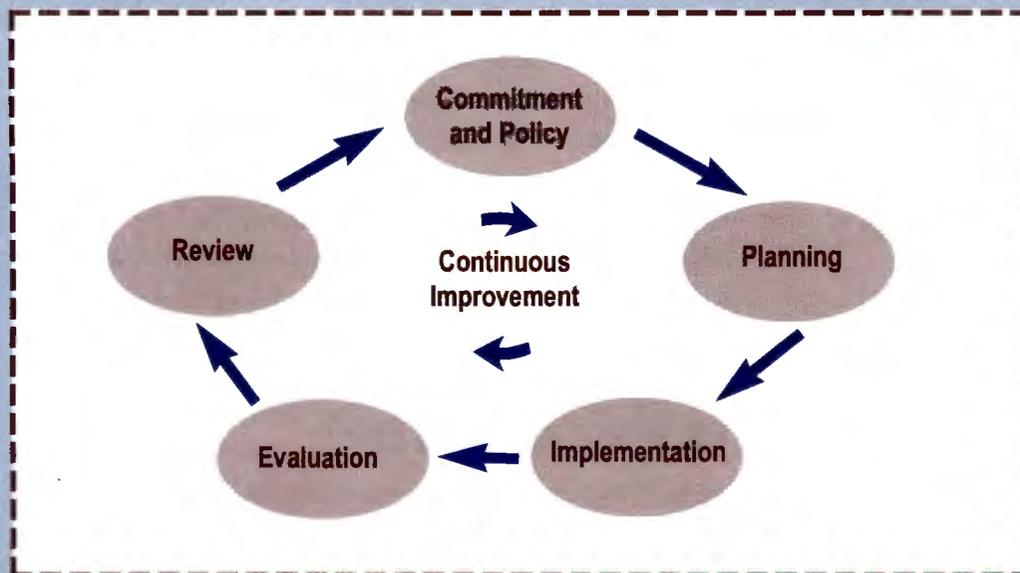
- improved worker health and safety
- reduced costs — greater efficiency means fewer materials used and less time and energy wasted
- increased business opportunities — customers may start requiring their suppliers to have an EMS

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## What is an EMS?

An Environmental Management System (EMS) is a framework that helps a company achieve its environmental goals through consistent control of its operations. The assumption is that this increased control will improve the environmental performance of the company. The EMS itself does not dictate a level of environmental performance that must be achieved; each company's EMS is tailored to the company's business and goals.

An EMS encourages a company to continuously improve its environmental performance. The system follows a repeating cycle (see figure). The company first commits to an **environmental policy**, then uses its policy as a basis for establishing a **plan**, which sets objectives and targets for improving environmental performance. The next step is **implementation**. After that, the company **evaluates** its environmental performance to see whether the objectives and targets are being met. If targets are not being met, corrective action is taken. The results of this evaluation are then **reviewed** by top management to see if the EMS is working. Management revisits the environmental policy and sets new targets in a revised plan. The company then implements the revised plan. The cycle repeats, and continuous improvement occurs.



**The continuous improvement cycle.**

The most commonly used framework for an EMS is the one developed by the International Organization for Standardization (ISO) for the ISO 14001 standard. Established in 1996, this framework is the official international standard for an EMS.

The five main stages of an EMS, as defined by the ISO 14001 standard, are described below:

### **Commitment and Policy**

Top management commits to environmental improvement and establishes a company environmental policy. The policy is the foundation of the EMS.

### **Planning**

A company first identifies environmental aspects of its operations. Environmental aspects are those items, such as air pollutants or hazardous waste, that can have negative impacts on people and/or the environment. A company then determines which aspects are significant by choosing criteria considered most important by the company. For example, a company may choose worker health and safety, environmental compliance, and cost as its criteria. Once significant environmental aspects are determined, a company sets objectives and targets. An objective is an overall environmental goal (e.g., minimize use of chemical X). A target is a detailed, quantified requirement that arises from the objectives (e.g., reduce use of chemical X by 25% by September 1998).

The final part of the planning stage is devising an action plan for meeting the targets. This includes designating responsibilities, establishing a schedule, and outlining clearly defined steps to meet the targets.

### **Implementation**

A company follows through with the action plan using the necessary resources (human, financial, etc.). An important component is employee training and awareness for all employees. Other steps in the implementation stage include documentation, following operating procedures, and setting up internal and external communication lines.

### **Evaluation**

A company monitors its operations to evaluate whether targets are being met. If not, the company takes corrective action.

### **Review**

Top management reviews the results of the evaluation to see if the EMS is working. Management determines whether the original environmental policy is consistent with company values. The plan is then revised to optimize the effectiveness of the EMS. The review stage creates a loop of continuous improvement for a company.

## Facility Profile

Acushnet Rubber  
Company, Inc.

New Bedford,<sup>™</sup>  
Massachusetts

Three facilities in New  
Bedford, MA employ 1,100  
people combined; one  
facility in Thailand employs  
425 people.

Designs and  
manufactures  
elastomeric products  
including liquid cast  
polyurethane product lines.

Customers include Ford,  
Chrysler, General Motors,  
Lexmark, and Xerox.

Estimated sales for 1997:  
\$90 million.

- increased employee awareness about the production process, because an EMS encourages employee involvement in identifying problem areas
- improved public relations — an EMS reflects a company's commitment to minimizing its impact on its employees and the surrounding community.

## Establishing an EMS at Acushnet Rubber Company

Acushnet Rubber Company, Inc. in New Bedford, Massachusetts, established an EMS based on DfE principles. This bulletin presents some examples of how Acushnet reduced production costs and improved worker safety through its EMS.



## How the EMS Created Improvements at Acushnet

Since implementing a DfE-based EMS, Acushnet has realized many benefits. The company has slashed its use of toxic chemicals, raised production, added employees, and realized annual cost savings.

In addition, Acushnet has gained a competitive advantage in the marketplace by becoming one of the first companies in the industry to establish an EMS. In fact, Acushnet is ISO 14001-certified (see the section, "What is an EMS?"). According to Jack Bailey, Environment, Health, and Safety Director, the EMS enables the company to weed out inefficiencies and cut costs to a degree not previously attainable. "We're in business to make money," states Mr. Bailey. "Our EMS makes good business sense for Acushnet."

Acushnet emphasized two main DfE concepts when establishing its EMS:

- reducing risk to workers and the environment
- implementing cleaner technologies and processes

## Reducing Risk to Workers and the Environment Through a DfE-Based EMS

One of the main DfE concepts is reducing the risk to workers and the environment. Acushnet considers this risk when identifying the significant environmental aspects of the company (see the section, "What is an EMS?"). To determine the significance of an environmental aspect, Acushnet uses the following criteria:

- waste disposal cost
- impact on human health

## For More Information

If you would like more information about Acushnet Rubber Company, Inc., and the company's experience with establishing an environmental management system, contact:

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- material cost
- toxicity rating
- likelihood of noncompliance
- energy consumption
- impact on resources, such as labor

Two criteria, impact on human health and toxicity rating, represent the environmental aspect's risk to humans and the environment. To measure the human health risk and toxicity associated with an environmental aspect, Acushnet uses various resources, such as the list of carcinogens or potential carcinogens from the International Agency for Research on Cancer (IARC), the Hazardous Materials Identification System (HMIS) ratings found on a Material Safety Data Sheet (MSDS), and the list of Toxics Release Inventory (TRI) chemicals regulated under Section 313 of the Superfund Amendment and Reauthorization Act (SARA) Title III.

For example, Acushnet rated trichloroethylene (TCE) emissions as a significant environmental aspect for three main reasons: hazardous waste disposal costs, TCE's impact on human health, and TCE's toxicity rating (IARC listed it as a potential carcinogen). Since TCE emissions were identified as a significant aspect, Acushnet set an objective to minimize TCE use and set a specific target of completely eliminating TCE by the end of the fiscal year (see the section, "What is an EMS?").

The first step toward reaching the target was to identify where the TCE was used. Acushnet's suppliers stamped metal parts using a grease coating to facilitate the stamping process. Acushnet used TCE in a vapor degreaser to clean these metal parts. The company convinced their suppliers to replace the grease coating with a water-based lubricant, thereby eliminating TCE use from the cleaning of about 80 percent of its parts. For the remaining 20 percent (parts that were cylindrical and required heavier oils in their production), Acushnet incorporated a two-step aqueous cleaner to replace TCE.

As a result of these efforts, the degreasers have been shut down. Due to the elimination of TCE in the facility, Acushnet saves approximately \$100,000 annually. More importantly, the company has reduced risk by eliminating

the use of a suspected carcinogen in the workplace.

## Implementing Cleaner Alternatives Through a DfE-Based EMS

Another way to improve environmental performance and reduce risk is to replace traditional processes, technologies, and practices with "cleaner"



**Ray Lohievre at Acushnet works with the aqueous cleaner that replaced TCE.**

## About the Design for the Environment Program

The goal of the Design for the Environment Program is to provide industry with information that can help companies design an operation that is more environmentally sound, safer for workers, and more cost-effective.

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To obtain additional copies of this or other bulletins and case studies, or for more information about EPA's Design for the Environment Program, contact:

**EPA's Pollution Prevention Information Clearinghouse (PPIC)**

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Website: <http://www.epa.gov/dfe>

alternatives. DfE encourages companies to consider the trade-offs among performance, cost, and environmental and human health risks when evaluating these alternatives. Evaluating alternatives is an important part of the action plan in a company's DfE-based EMS (see the section, "What is an EMS?"). For example, Acushnet identified waste adhesive as a significant environmental aspect due to the health risks posed by the adhesive's VOC content. Three workers in the adhesive application area led by Tony Mello noticed that spraying metal parts with adhesive was not an efficient operation, and that the excess spray posed a health risk to themselves and to others.

Encouraged by the DfE EMS to find alternative processes, the workers suggested replacing the spraying process with a cleaner, more efficient process that dips the metal parts in a vat of adhesives and then spins them in a centrifuge. Management, along with the shop floor workers, evaluated this alternative and discovered that the new process:

- worked just as well and also eliminated the excess spray of the adhesive
- would save the company money in reduced labor and less adhesive
- cut the health risk to workers

The money saved from their suggestion will pay for the new system in less than six months. The company now saves \$40,000 per year in labor and material costs. Through the DfE-based EMS, all employees at Acushnet are encouraged to continuously seek these types of alternatives that can reduce risk while improving efficiency.

## A New Way of Thinking

Establishing an EMS requires a change in the way management and employees think about the environment. An EMS takes all of the elements of a business and views them as one system. Equipped with this new way of thinking, Acushnet's workforce is constantly looking for new solutions that will improve the company's operations. "We think this is a sound strategy," explains Mr. Bailey. "If it worked for us, there's a good chance it will work for other companies."

## Additional Resources

In addition to this case study, the DfE Program is working to develop tools to help facilities establish an EMS based on DfE concepts.

