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Green Manufacturing

As companies embark on the uncharted territory of the new technology age of the 21st century, companies are expanding their competitive horizon and entering in international markets. In hopes to prosper and exceed the demands of the everyday changing environment that exists domestically and abroad, companies are incorporating a variety of tools to meet these demands and enhance their performance. Over the years, due to the availability and advancement in technology, environmental issues and governmental regulations concerning the manufacturing industry has become a problem that can't be "tossed under the pile" as it has been in the past.

In order to compete in international markets, industries must conform to these regulatory standards. One of the most difficult strategic challenges that the manufacturing industry faces, is the impeded overseas environmental regulations. With the movement towards a more environmentally friendly atmosphere, countries are imposing stricter environmental conformances. With the concept of the Green Manufacturing, companies are able to meet those regulations and also incur lower production costs in the process.

Green Manufacturing is a method for manufacturing that minimizes waste and pollution. It slows the depletion of natural resources as well as lowering the extensive amounts of trash that enter landfills. Its emphasis is on reducing parts, rationalizing materials, and reusing components, to help make products more efficient to build.

The reason it is such an important tool is because it intertwines with today's manufacturing strategies of global sourcing, concurrent engineering, and total quality. Green Manufacturing is implemented through product and process design. Its goal is to achieve sustainability to support future generations and at the same time preserve our natural resources

The concept of Green Manufacturing has its roots from Germany that requires importing companies to take responsibility and remove any packaging materials used for that product. In fact, the Germans have established a de facto global manufacturing standard instilling that, "any U.S. companies wishing to compete globally must start making products that will comply with the green dictates of the huge European market."

A common approach to using Green Manufacturing has been through Design for Disassembly (DFD) or also known as Manufacturing for Reuse. Design for Disassembly is making products to come apart easier. Stated by Bylinsky, "The goal is to close the production loop, to conceive, develop, and build a product with a long-term view of how its components can be refurbished and reused at the end of the product's life." Using DFD saves time, money, improves quality, saves resources and materials, and makes products easier to recycle. It also is used to reduce the number of parts contained in a product thus the fewer the parts, the faster the disassembly process will be. Instead of using traditional "nuts & bolts" in the assembly, using snap fits are an alternative since welded or glued parts are harder to separate. Thus, when entering the tear down phase of the product, a dismantler will be able to pull parts faster than they can be unscrewed. For example, Square D Co.'s metal circuit-breaker box contained 173 parts. The redesigned injection molded plastic box has only 42 parts.

Part consolidation is also another aspect of Design for Disassembly. Since there are fewer pieces to manufacture, energy costs in production are saved. Industry Weeks states, “Design for Disassembly is one way that we’re trying to make products more environmentally responsible. It’s designing the product so that it can be disassembled inexpensively. If we can’t do that, we’ll never get anywhere in the recycling process.”

Another important piece to recognize in Design for Disassembly, is the selection of materials used in products. To consolidate and have fewer parts used for a product, it becomes easier to track and separate the item. For example, The parts used in the “Ukettle” (the first available recyclable appliance) created by Polymer Solutions, made from a modified polyphenylene oxide, has the names and numbers of the types of plastic they’re made of, molded into their inside. Therefore, when the products life is over, those parts can easily be separated and placed into the right bins for proper removal. It is also found that it is easier to recycle products that aren’t made of many different materials.

An example of how Green Manufacturing has valuable products being redesigned in the U.S. to conform to the environmentally friendly environment, is in the automobile industry. Almost everywhere cars are built, they have high efforts to make them more applicable for disassembly and to reuse their parts. The U.S. already reuses 75% of American cars, done mostly by scrap yards and shredders. Stated by Bylinshy, “Cars are first stripped of valuable parts such as engines, generators, alternators, and other components that can be refurbished and sold by some 12,000 auto parts recyclers. Also, the metal carcasses end up in the gapping maws of some 200 shredders that reduce the metal skeletons to steel fragments, which are shipped to steel makers to make more car bodies.” This can lower recycling costs dramatically and reduce environmental hazards.

The remaining 25% of the car consists mainly of plastics and foam rubber. Every year roughly 3 million tons of this ends up in landfills. Therefore, General Motors, Chrysler and Ford form the Vehicle Recycling Partnership to develop ways to recover and reuse much of the remaining scrap from the vehicles as possible.

Design for Disassembly and Reuse continues to grow around the world as the need for resources and available space continue to diminish. Many European countries are quicker to adopt Green Manufacturing than the U.S. due to the lack of a mechanism for coordinating efforts in producing environmentally critical technologies. DFD exemplifies the growing concern for the environment and it will continue to be a part of manufacturing companies that choose, and in some cases need to import overseas to compete in today's competitive marketplace. However, there always exists a resistance to change in any environment, and this resistance will be a strategic challenge for U.S. companies to overcome as they pursue excellence through the tool of Green Manufacturing. If you would like further information on Green Manufacturing the resources listed are helpful.

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