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Governor's Pollution Prevention Award, 1997 Recipient

The Timken Company



The Timken Company is being recognized for;

- ◆ ***Operating of acid recovery plants in Canton and Wooster, Ohio which recycle used sulfuric acid,***
- ◆ ***recovering commercially saleable iron compounds from the acid recycling process,***
- ◆ ***recycling metallic dust from electric arc furnace operation,***
- ◆ ***substituting hazardous chemicals with more environmentally sound alternatives.***

The Governor's Awards for Outstanding Achievement in Pollution Prevention have been presented since 1986. The Timken Company was one of seven recipients to receive the Award in 1997. These awards recognize outstanding commitments to improve Ohio's environment through pollution prevention. Evaluation criteria for the awards include: the reduction of waste at the source, recycling or recovery of materials, cost-effectiveness, ability of the program to serve as a model for others, and effectiveness in promoting pollution prevention as the preferred long-term approach.

The Timken Company

The Timken Company (Timken) is a leading international manufacturer of highly engineered bearings and alloy steel with worldwide headquarters in Canton, Ohio. Timken has 146 plants, offices, and distribution centers in 24 countries. Thirteen facilities are located in Ohio providing over 8000 jobs.

Pollution Prevention Activities

Timken's pollution prevention projects reduced hazardous waste generation by over 4.1 million pounds and solid waste by over 32 million pounds annually. This was achieved by means which included the installation of two acid recovery systems, recycling the dust from an electric arc furnace, eliminating 1,1,1 trichloroethane (TCA), replacing a cleaning unit that used freon with one using an alkaline cleaner, and replacing a rust preventative with one that was free of nitric acid. Timken's efforts included becoming a member of Ohio Prevention First and US EPA's 33/50 program. Ohio Prevention First is a voluntary planning initiative with the aim of reducing pollution generation throughout the state for businesses in Ohio. US EPA's 33/50 program successfully targeted a number of hazardous wastes for



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reductions of 33% by 1992 and 50% by 1995. Timken was able to achieve a 50% reduction by 1992. These projects had a capital cost of \$15 million and an annual cost savings of \$4.2 million, realizing a payback period of less than four years.

Acid Recovery Systems

Timken began operating the world's largest state-of-the-art acid recovery plant at their Gambrinus Steel Plant in Canton in 1989. The plant was designed to recycle used sulfuric acid from the pickling operation. Pickling removes oxidized scale from steel surfaces by dipping the steel in a sulfuric acid solution. After many batches are pickled, the solution has to be replaced. The acid is then piped to the recovery system where iron compounds are removed during a cooling process. The iron compounds form sulfate crystals to be sold as a nonhazardous, raw material used to make magnetic tape, fertilizer, and water treatment chemicals. Recovered acid is sent back to the pickle vats for reuse.

In 1996, the acid recovery plant processed over 5.1 million gallons of spent acid producing 4,274,760 gallons of recovered acid and 9,208,000 pounds of sulfate crystals. A similar operation at the Wooster Steel Plant processed over 1,100,000 gallons, recovering 950,000 gallons of acid and 1,984,000 pounds of sulfate crystals.

33/50 Program

In 1991, Timken committed to the US EPA's 33/50 Program. Timken's efforts focused on reducing off-site releases of chromium, lead, and nickel, as well as heavy metal from electric arc furnace (EAF) dust and TCA. Timken recycled 50% (600,000 pounds) of the Harrison Steel Plant's EAF dust on site and sent the remainder to a reclaimer, along with the dust from the Faircrest Steel Plant, for high temperature metals recovery. Timken's Faircrest and Harrison Steel Plants emission control systems and baghouses capture 99.5% of EAF dust generated from the steel melting process. These changes combined to decrease Timken's TRI releases by over 80%.

TCA had been used to clean and degrease bearings in preparation for the finishing processes. In 1991, a team was assigned to find a replacement for TCA. They found an alkaline cleaner that was acceptable. Use of TCA led to the release of 231,500 pounds in 1988. Releases were down 60% in 1992, and eliminated in 1995.

Elimination of Freon

At the Bucyrus Bearing Plant, freon was used to clean and degrease bearings. In 1988, releases from freon totaled approximately 87,000 pounds. The conversion to alkaline solution began in 1992, and freon releases were eliminated in 1994.

Change in Coatings Solution

At Timken's Gambrinus and Wooster Plants, steel tubes are dipped in a coating to prevent rust. The old coating solution was oil based and contained phosphoric acid, nitric acid and zinc compounds. This generated 158,000 pounds of releases. The new solution contains no nitric acid and less phosphoric acid. This has eliminated release of nitric acid (47,500 pounds) and reduced phosphoric acid releases by 29% (34,000 pounds).

Drop Out Chamber for Electric Arc Furnace (EAF)

Prior to 1995, at Timken's Faircrest facility, a retractable duct was used to direct gases from the EAF to the main duct leading to the baghouse. This duct required frequent maintenance to clear out large particles of metal. Large splashes of molten metal around the EAF also required frequent cleaning. Cleanup materials had to be disposed as hazardous waste.

Faircrest replaced the retractable duct with a larger, more precisely engineered elbow leading to a drop out chamber. The large duct deflects splashes of molten metal back into the furnace, eliminating extensive cleanup. It also prevents large particles from interfering with the flow of gases to the emission system by allowing them to drop out of the gas stream before entering the main ductwork.

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In 1996, the amount of EAF dust generated decreased by over 1.2 million pounds. In addition, over 1.1 million pounds of particles were collected in the drop out chamber and recycled instead of disposed.

Other Projects

Installation of Pre-enameled Siding at Harrison Steel Plant

A large section of siding needed to be repainted at the Harrison Steel Plant. As part of surface preparation, paint chips were analyzed and found to contain levels of lead requiring abatement. Due to cost considerations and concern for health, safety and the environment, the siding was recycled on-site and replaced with pre-enameled siding. Choosing siding over painting prevented the release of over 10,000 pounds of volatile organic compounds and eliminated generation of over 45,000 pounds of lead chips, saving Timken more than \$1,042,000.

Scrap Recycling In 1996, the Harrison Steel Plant recycled 180,333 tons of company generated scrap and purchased 318,621 tons from other users. The Faircrest Steel Plant recycled 309,255 tons and purchased 656,230 tons of scrap.

Wood Pallet Recycling Timken recycled 481,980 pounds of wood pallets in 1996; 98% of which were repaired and reused by Timken, saving \$26,000.

Soluble Oil Recovery Timken processed over 20,000,000 gallons of waste soluble oil in 1996, recovering over 1,000,000 gallons of oil.

Grinding Swarf is the fine metal particles and grinding wheel grit generated during grinding in Timken's bearing plants. Although grinding swarf is difficult to recycle, Harrison Steel Plant recycled 15,762 tons in 1996, saving \$400,000 in disposal costs.

Environmental Benefits

Pollution prevention projects have protected the environment by eliminating sources of hazardous waste, removing ozone-depleting chemicals from use, and recycling material that was formerly disposed.

Timken's acid recovery systems generated a nonhazardous saleable product rather than a hazardous waste. At the Wooster Steel Plant, the system is on site, eliminating the need to transport hazardous material and helping limit risk to the environment and community. The systems reduce the amount of raw sulfuric acid solution needed for the pickling process by 80%.

Economic Benefits

Timken anticipates long-term savings from the acid recovery system in Canton and immediate and long-term savings from reduced landfill use. The system

at the Wooster Steel Plant cost \$265,000 and saved \$199,600.

Recycling over 6,000,000 pounds of EAF dust on-site saved Timken approximately \$500,000 in 1996. Off-site reclamation instead of disposal saved another \$500,000.

Elimination of TCA saves Timken over \$600,000 annually. Elimination of freon cost \$285,000 for the alkaline cleaning unit and saves approximately \$300,000 annually.

The drop out chamber cost \$2,500,000 to purchase and saves \$600,000 dollars annually through reduced maintenance and improved productivity.

Health and Safety Benefits

Pollution prevention projects have improved the health and safety conditions for Timken's employees by reducing exposure to acid, freon and TCA. The State of Ohio benefited from reduced use and transportation of hazardous materials. Source reduction techniques resulted in less hazardous waste generated and disposed.

Management Commitment

An industry leader in environmental protection, Timken is dedicated to waste minimization and pollution prevention. In 1990, formal waste minimization and pollution prevention teams

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were formed to identify opportunities to reduce or eliminate waste and toxic materials.

Timken encourages its employees to be aware of environmental impacts in their daily activities. Timken uses training, company videos and newspapers, company environmental policy, and team meetings to help employees recognize pollution prevention and waste minimization opportunities.

In 1995, the Timken Foundation funded the first annual Envirofest for businesses in Stark County and the surrounding area. Management believes protecting the environment is the obligation of all associates and that it will add to the success of the company.

Ohio Prevention First

Timken is an active participant in the *Ohio Prevention First* initiative, which provides an important opportunity for business and industry to take a leadership role in environmental protection without additional regulatory demands.

Transferability

Timken has concentrated on spreading these ideas to its other facilities around the world. In addition, Timken shared pollution prevention and waste minimization case studies at the second Envirofest in Stark County in 1996. A member of many industry associations, Timken's manager of environmental control

serves on numerous environmental committees, sharing experiences of pollution prevention and waste minimization successes.

For More Information

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This is one in a series of documents Ohio EPA has prepared on pollution prevention. For more information, call the Office of Pollution Prevention at (614) 644-3469.

The Office of Pollution Prevention was created to encourage multi-media pollution prevention activities in Ohio to reduce risk to public health, safety, welfare and the environment. Pollution prevention stresses source reduction and, secondarily, environmentally sound recycling while avoiding cross media transfers. The Office analyzes, develops, and publicizes information related to pollution prevention and increases awareness of pollution prevention opportunities via education, outreach, and technical assistance programs for business, government, and the public.

Office of Pollution Prevention WWW address: www.epa.state.oh.us/opp
