DUCOMMUN AEROSTRUCTURES

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Company background

Ducommun, founded in 1849 in Santa Ana, California, employs 2,500 people to provide manufacturing and engineering services to aerospace, defense and industrial markets. Originally started as a hardware supply store, it later specialized in electronic and structural systems to supply commercial aircraft platforms, mission-critical military and space programs, and sophisticated industrial applications with intricate products. The Parsons location has the ability to produce more than 4,000 different parts, with a specialization in Titanium manufacturing.

Project background

Ducommun's management has expressed interest in reducing/eliminating waste generation through determining process line improvements. Some of these process lines include chemical milling, hot forming, vacuum press and waterjet cutting. Also, examining ways to reduce hazardous air pollutants as well as volatile organic compounds by analyzing Ducommun's maskant application process. Additionally, highlighting environmental, social and governance initiatives and past projects. Management also expressed interest in reducing water usage and reducing energy usage by improving energy efficiency.

Incentives to change

Ducommun's change incentives stem from a strong motivation to protect the environment and guarantee the health and safety of all employees in order to ensure long-term sustainability. Ducommun protects the environment through waste reduction, increased energy efficiency, water-usage reduction and decreased carbon emissions. In 2024, Ducommun reduced total energy usage by 20%, water demand by 3.7 million gallons annually, and greenhouse gas emissions by 50% compared to 2019 levels. Also, between the beginning of 2021 and the end of 2024, Ducommun's lost-time incident rate and total-recordable incident rate dropped by 87% and 54%, respectively.

PROJECTS REVIEWED FOR P2 POTENTIAL

Maskant replacement

Ducommun has found a water-based maskant alternative that would eliminate all hazardous air pollutants and volatile organic compounds associated with its maskant application process. From conducting tests on the alternate maskant, the intern determined that it is a suitable replacement to Ducommun's current maskant. By switching to this new maskant, it would result in 9,317 pounds of VOCs and 9,317 pounds of HAPs being reduced.

Chemical milling waste reduction

There are two chemical lines at the Parsons location, each of which contain several rinse tanks and chemical tanks. One of these chemical lines balances the pH of both the rinse and chemical tanks so that it can be sent to the local wastewater treatment plant. The other chemical line is only capable of balancing the pH of its rinse tanks which leaves the contents of its chemical tanks subject to being disposed of as hazardous waste. This accounts for the generation of 217,248 pounds of hazardous waste per year and $124,894 spent on hazardous waste pickups per year. Installing a system that processes the chemical tanks would result in net annual savings of $27,590 and a payback period of 4.37 years.

Vacuum press process change

Ducommun's vacuum presses produce a part called an aft cowl. The process for producing aft cowls requires insulating blankets, which deteriorate and become unusable within two to three uses. These blankets account for 7,148 pounds of annual waste production and cost $75,690 per year. In collaboration with another intern, it was determined that that the aft cowl could be produced in one of Ducommun's many industrial ovens. Producing the aft cowls in one of the ovens would eliminate the need for $73,610 worth of blankets per year and therefore reduce the waste production associated with them. This process change requires three new dies with a cost totaling to $56,853 and a payback period of 0.77 years.

Hot-form doors retrofit

Ducommun operates seven hot-form presses which, much like the vacuum presses, are insulated using blankets that deteriorate rapidly. A project was proposed to install doors onto these presses so that blankets would no longer be needed. As the blankets deteriorate, their insulation often gets incorporated into parts which lead to costly scraps and reworks. This along with the cost of the blankets, energy loss and trash brings the potential net annual savings to $159,909. Also, hot-form blankets account for 4,028 pounds of annual waste. Retrofitting the hot-form presses with doors would save the aforementioned amount of money and trash but also 518,137 kWh per year due to their better insulation capabilities. This project is recommended once a door design has been finalized.

Heat press cooling tower

The largest hot-form press that Ducommun operates, called press 12, is cooled by pumping water from the water supply and sending it back to the wastewater treatment plant. This process only uses water for one cycle and consumes 11,289,888 gallons of water per year. A cooling tower was installed during the intern's time at Ducommun, resulting in net annual savings of $161,375 and a payback period of 10.26 months. The addition of this cooling tower decreased overall yearly water consumption by 61%.

Waterjet closed-loop cooling system

All three of Ducommun's waterjets are cooled in the same way as press 12 and consume a total of 530,400 gallons of water per year. This project would require two cooling loops because the waterjets are too far away from each other to only require one loop. The net annual savings were calculated to be $3,691 but proved to be unfeasible due to its payback period of 5.42 years.

Abrasive recycling

Ducommun utilizes two abrasive medias called garnet and aluminum oxide. Garnet is used in the waterjets and aluminum oxide is used in the sand blasting chambers. After being used the abrasives are disposed of at a landfill. The intern discovered a recycling company that reprocesses garnet and aluminum oxide at a lower price. It was found that recycling the abrasives saves $18,072 and 134,100 pounds of solid waste annually.

SUMMARY OF 2025 P2 INTERN RECOMMENDATIONS

Project	Annual estimated environmental impact	Estimated cost savings ($/year)	Status
Maskant replacement	9,317 lbs. of VOCs 9,317 lbs. of HAPs	-$16,045	Recommended
Chemical milling waste reduction	217,248 lbs. of hazardous waste per year -2,714,781 gallons of water	$27,590	Recommended
Vacuum press process change	7,148 lbs. of solid waste	$73,610	Recommended
Hot form doors retrofit	-518,137 kWh 4,028 lbs. of solid waste	$159,909	Recommended
Heat press cooling tower	11,289,888 gallons of water -180,981 kWh	$161,375	Implemented
Waterjet closed-loop cooling system	530,400 gallons of water -53,040 kWh	$3,691	Not recommended
Abrasive recycling	134,100 lbs. of solid waste	$18,072	Recommended
Total[1]		**$424,514**	
GHG reductions[1,2]	**323.2 metric tons CO_2e**		

[1]Does not include projects "not recommended" or where "more research needed."

[2]EPA P2 GHG Calculator with Cost, 29 November 2022 & EPA WARM Tool- Version 16, December, 2023