The Green Manufacturing Industrial Consortium’s January 2014 Newsletter

Thanks for all you’ve done, Nathan!

Written by Nathan Christensen

Hello everyone! What a journey the last few years have been! During the previous weeks I have started to transition out of my role as a research associate for the GMIC in preparation for my new position as an Associate Energy Engineer with Kautex, a Textron company. My major roles and responsibilities will center on working to conserve energy at their casting and blow molding facilities throughout North America.

I would like to offer my sincerest of thanks to all of my co-workers, industry mentors, and the companies who have granted me the opportunity to work with them. The experiences I have gained in multiple manufacturing settings and project types have been absolutely invaluable. I have no doubt that my ability to speak passionately and sincerely about the breadth of projects I have worked on helped give me an edge in obtaining my new position. This means that I have all of you to thank for helping me succeed, so again, thank you! I look forward in seeing you all in the coming months as I hope to stay involved with the "green" manufacturing culture of West Michigan.

Welcome to the Team!

Collins Wekesa joined the team this past January. He is an undergraduate student majoring in Chemical Engineering with an emphasis in Energy Management.

Shaun Shields joined the team last November. He is an undergraduate student majoring in Chemical Engineering with a focus on Energy Management. Shaun also has a keen interest in continuous improvement and process control, and he is excited to apply what he has learned into the industrial environment.

Compressed Air Leak Study @ Poly-Wood, Inc.

Written by Suresh Baskaran

On July 2013, the Green Manufacturing Industrial Consortium of Western Michigan University set out to solve the problem of compressed air leakages at Polywood, Inc. In that regard, an IUPUI assessment was conducted at the company premises, which revealed that the compressed air leakage was a substantial issue in plants 1, 2, 4 and 5. On evaluating the operating costs involved in running the compressed air units at the plant, it clearly revealed that not only can the leakage be arrested at no extra cost; it will also result in cost savings and resources for the company.
For determining the number of air leakages as well as each leak size, the team performed a comprehensive air leakage study using a 3000-Ultrasonic Leak Detector. The ultrasonic data that was collected proved to be the cornerstone around which important inferences were arrived at and appropriate solutions were decided upon to deal with the problem at hand. The detector aided in determining important details such as the areas of leakage, the different kinds of leakage, leak rate and leak severity. The data, which was recorded in detail to help in following up on the leakages for future maintenance, was then analyzed using the DMS software developed by the UE systems. The dB value of the recorded leakages helped in calculating the size of the leakages as well as determining the cost and energy savings for Polywood Inc. with the use of UE systems’ standard charts.

After the analysis, a total of 142 leaks were identified in plants 1, 2, 4 and 5. Further analysis showed that the loss of air caused a total loss of 299,053 kWh of energy, which translates to an annual cost of $35,900. The following chart indicates the percentage of each leakage type that contributed to the total energy and monetary loss based on the CFM.

<table>
<thead>
<tr>
<th>Month</th>
<th>Plant</th>
<th>Annual Compressor operating time (hrs.)</th>
<th>Total Number of Leaks Identified</th>
<th>Identified size of Leak (cfm)</th>
<th>Annual Cost Avoidance</th>
<th>Annual Energy Avoidance (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2013</td>
<td>Plant 1</td>
<td>8424</td>
<td>23</td>
<td>84.1</td>
<td>$16,776.75</td>
<td>139,806.26</td>
</tr>
<tr>
<td></td>
<td>Plant 2</td>
<td>2610</td>
<td>70</td>
<td>194.7</td>
<td>$12,040.20</td>
<td>100,335.03</td>
</tr>
<tr>
<td></td>
<td>Plant 2 (upper level)</td>
<td>2610</td>
<td>35</td>
<td>64.3</td>
<td>$3,976.16</td>
<td>33,134.66</td>
</tr>
<tr>
<td></td>
<td>Plant 4</td>
<td>2500</td>
<td>8</td>
<td>32.3</td>
<td>$1,910.70</td>
<td>15,922.54</td>
</tr>
<tr>
<td></td>
<td>Plant 5</td>
<td>2500</td>
<td>6</td>
<td>20.0</td>
<td>$1,182.61</td>
<td>9,855.06</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>18644</td>
<td>142</td>
<td>395.4</td>
<td>$35,886.43</td>
<td>299,053.55</td>
</tr>
</tbody>
</table>

The causes of these compressed air leaks were attributed to looseness, over-tightening, corrosion or contamination. The identified leakages were arrested using Teflon and were retightened. While this exercise yielded immediate positive results, it was concluded that it would not be enough to fix these leakages just once. A periodic maintenance inspection has to be done and all inspection records have to be properly documented to ensure a smooth follow up, which will help a lot in reducing the leak rate. This periodic maintenance should be implemented as a preventive maintenance measure, which will in turn result in massive cost and energy savings as Polywood Inc.’s volume of operations goes up.

Environmental Footprint Reduction Workshop at Steelcase

Written by Nathan Christensen

On September 24, representatives from the Green Manufacturing Industrial Consortium attended the Environmental Footprint Reduction Workshop: Finishing Operations event hosted by Steelcase and organized by the Green Manufacturer Network. Representatives included Dr. David Meade as a featured speaker, presenting on the topic of reuse and recycling powder paint overspray with Dr. Upal Attanayake, as well as graduate research associate Nathan
Christensen. The event provided an in-depth look at finishing operations and how to reduce resource consumption, as well as the importance of establishing a lasting, long term relationship with your supplier network. Detailed tours of two finishing lines, powder coat and staining, each at a different Steelcase facility was also featured during this event.

Additional presentations included Pretreatment System Improvements from representatives at DuBois Chemicals and Steelcase, as well as Coating Application and Curing Opportunities for Footprint Reductions from representatives at George Koch Sons, Sherwin Williams, and Steelcase. The event, through the comprehensive presentations, detailed facility tours, and ample networking time, provided a great experience for learning about opportunities for improving finishing line operations and reducing their environmental impact.

STEMulating Careers Program

Check out the pictures below from the STEMulating Careers Event put on by Western Michigan University. This event brought more than 200 middle school students to campus to learn about future career options and participate in educational activities. Colin and Marylin facilitated a hands-on recycling demonstration for the students, where they learned how to sort and separate all their waste!

RETAP Assessment Participation

Written by Joe Imesch

In mid-November two GMIC students, Joe Imesch (E.M.) and Shaun Shields (Chem.E) had the privilege to assist Louis Gibson and Richard Edwards two RETAP engineers with an energy audit. This audit was performed at Owen's Products in Sturgis Michigan. Owen's Products manufactures aftermarket car products such as tool boxes for trucks, running boards, and even dog kennels for trucks. They also make military transportation kennels for service dogs. This was a great learning opportunity for Shaun and Joe. They were able to observe how professional engineers evaluate energy consumption at a manufacturing facility. The audit was all encompassing. It evaluated the lighting fixtures, air compressor settings, HVAC system, and insulation found at the facility - just to name a few items. The GMIC now has gained knowledge passed down from experienced engineers regarding energy audits that it can now share with its industrial members.

We wish you well, Alexis!

Written by Colin Knue

After spending just under a year with the GMIC, Alexis Montas graduated with his Master's degree in Electrical Engineering this past December. Shortly after graduation he began working at Wirtz Manufacturing located in Port Huron, Michigan. Alexis is working in the areas of project design, material processing and procurement, as well as interfacing with customers on various equipment designs. We wish Alexis well and hope the best for him in his future endeavors.