Industrial Assessment Centers: Workforce Development
MSU IAC – Center

Industrial Assessments (MSU & Michigan Tech)
Throughout Michigan & surrounding areas

Commercial Building Assessments (MSU & Henry Ford College)
Targeting central/south Michigan
Industrial Assessment Center (IAC) @ MSU

**Additional Diverse Expertise**

Dr. Tim Mrozowski  
Assessment Leader  
*Building Envelope Systems Architect*

Dr. Susan Masten  
Environmental Engr.  
*Water and Wastewater Treatment*

Dr. Qiben Yan  
Computer Science and Engineering  
*Cybersecurity*

Dr. David Shonnard  
Chemical Engineering  
*Sustainable Materials*
IAC Mission & Goals: *Energy & Cost Savings*

(1) Supporting Manufacturers and Commercial Buildings

- 20 SME *industrial assessments*/year
- 10 *commercial building assessments*/year
- No-cost assessments
- Focused on energy, productivity, decarbonization, waste reduction
- Including supporting disadvantaged/underserved communities
Assessments: *On-site 1-day assessment*

**Common Systems:**
- Lighting
- HVAC
- Compressed air
- Envelope
- Pumps, fans & drive
- Process heat and cooling
- Misc/plug loads
Assessments: Post-Assessment & Report

Assessment Report

Reviewed by IAC program
Results entered into IAC database

Report Contents

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Follow up ~1 year Post-Assessment

- Which recommendations have been implemented
- Other resources, grant funding, etc…
"Thank you to your amazing team to help us determine areas we can make improvements. The whole experience was very beneficial to our company. We will be implementing a lot of your recommendations to save us energy and money."

2022

- MSU IAC: Completed Assessments 2022

- 30 Assessments
- 204 Recommendations
- 0.09 Tbtu Energy Saving*
- $1.17 million Cost Savings*
- 18 Students Trained

*Recommended Savings

2023

Already completed 22/30 this year
National data on concrete & concrete industry

Only 0.4% of total IAC assessments since 1981

<table>
<thead>
<tr>
<th>TOP</th>
<th>NAICS</th>
<th>Description</th>
<th>Assessments</th>
<th>Recommendations</th>
<th>Recommended $ Savings</th>
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<tr>
<td></td>
<td>327xxx</td>
<td>Nonmetallic Mineral Product Manufacturing</td>
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<td>Other Concrete Product Manufacturing</td>
<td>25</td>
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### All time

<table>
<thead>
<tr>
<th>ARC</th>
<th>Description</th>
<th>Recommendations</th>
<th>Recommended $ Savings</th>
<th>Average Payback (yrs)</th>
<th>Implementation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>open</td>
<td>2.xxxx ENERGY MANAGEMENT</td>
<td>504</td>
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<td>46.6%</td>
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<tr>
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<td>3.xxxx WASTE MINIMIZATION / POLLUTION PREVENTION</td>
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<td>20.0%</td>
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<td>21</td>
<td>$2,538,733</td>
<td>0.6</td>
<td>50.0%</td>
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</table>

### Looking only since 2013

The Assessment Recommendation Codes (ARC) is a system for classifying recommendations. [Manual]

<table>
<thead>
<tr>
<th>ARC</th>
<th>Description</th>
<th>Recommendations</th>
<th>Recommended $ Savings</th>
<th>Average Payback (yrs)</th>
<th>Implementation Rate</th>
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<tbody>
<tr>
<td>open</td>
<td>2.xxxx ENERGY MANAGEMENT</td>
<td>251</td>
<td>$13,473,515</td>
<td>1.7</td>
<td>42.7%</td>
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<td>4.xxxx DIRECT PRODUCTIVITY ENHANCEMENTS</td>
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<td>$1,792,516</td>
<td>0.5</td>
<td>37.5%</td>
</tr>
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</table>
Most recommendations are not specific to the cement/concrete industry.

Implementation rate for all but motor systems are low.

All data on IAC is available at https://iac.university/#database
IAC Mission & Goals: Workforce Development

(2) Train future workforce

- Engineering & non-engineering students
- Develop curriculum
- Teach energy & manufacturing related skills;
- Hands-on involvement/learning
- Provide & support internship/traineeship opportunities

<table>
<thead>
<tr>
<th>Students Trained</th>
<th>Michigan State University</th>
<th>Henry Ford College</th>
<th>Michigan Technological University</th>
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<tbody>
<tr>
<td>2022</td>
<td>17</td>
<td>2</td>
<td>2</td>
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<tr>
<td>2023</td>
<td>19</td>
<td>10</td>
<td>2</td>
</tr>
</tbody>
</table>
IAC Mission & Goals: Workforce Development

(2) Train future workforce
- Student Certificates
- Student Research Awards
IAC Mission & Goals: Workforce Development

**IAC Alumni in the Workforce**

**Skills**
- IAC Alumni graduate with an average of 8.9 specific, applicable skills in energy efficiency.
- IAC Alumni Resume: 8.9
- Peers*: 5.5

**Salary**
- IAC Alumni have a skill mix worth $6,210 more than their peers.
- IAC Alumni: $72,964
- Peers*: $66,754

**Hired**
- IAC Alumni are hired almost twice as fast as their peers into an energy efficiency job.
- IAC Alumni: 856 days
- Peers*: 1,643 days

https://betterbuildingssolutioncenter.energy.gov/better-plants/activity/connect-iac-graduates
# Workforce Development: Pilot 3-credit course

## Spring 2023 Training Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Introduction to Energy and Sustainability Assessments of Commercial and Industrial Buildings – motivations and need</td>
</tr>
<tr>
<td>Week 2</td>
<td>Building Assessment – Field work practice Part (1) - Identifying building equipment, components, asking energy assessment questions; ASHRAE Level 1, 2 and 3 assessments</td>
</tr>
<tr>
<td>Week 3</td>
<td>Utility Bill Analysis, AMI Data analysis, Building Benchmarking, CO2 emissions</td>
</tr>
<tr>
<td>Week 4</td>
<td>Utility Bill Analysis, AMI Data analysis, Building Benchmarking, CO2 emissions</td>
</tr>
<tr>
<td>Week 5</td>
<td>Building Energy Balance, Significant Energy Users</td>
</tr>
<tr>
<td>Week 6</td>
<td>Pre-Assessment Meeting Procedures &amp; Practice</td>
</tr>
<tr>
<td>Week 7</td>
<td>Building Envelope Systems - components, energy use, operation, energy savings opportunities, field equipment</td>
</tr>
<tr>
<td>Week 8</td>
<td>Spring Break – NO CLASS</td>
</tr>
<tr>
<td>Week 9</td>
<td>Lighting Systems</td>
</tr>
<tr>
<td>Week 10</td>
<td>Compressed Air Systems</td>
</tr>
<tr>
<td>Week 11</td>
<td>Pumps, Motors &amp; Drives</td>
</tr>
<tr>
<td>Week 12</td>
<td>HVAC systems</td>
</tr>
<tr>
<td>Week 13</td>
<td>Solar Energy Systems; Field Work Practice Assessment Part (2)</td>
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<tr>
<td>Week 14</td>
<td>Post Assessment Processes &amp; Implementation Follow up</td>
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<tr>
<td>Week 15</td>
<td>Water and Wastewater Treatment</td>
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<tr>
<td>Week 16</td>
<td>Combined Heat and Power (CHP)</td>
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</table>

- **Resources**
  - Cement/concrete industry would help train students and develop recommendations specific for this sector

- **Traditional scope of IAC**

- **New areas**
Workforce Development

Training Research

Evaluating the use of Virtual Reality to improve training and better prepare students for assessment processes; improve Post-Assessment process

Assessing the use of virtual reality for training

Virtual environment for assessment training
Collaborate with us!

Contact Us:

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http://iac.msu.edu
http://iac.university