ANALYSIS OF THE MAINTENANCE WORK ORDER DATA IN EDUCATIONAL FACILITIES

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METHODOLOGY AND RESULTS

MAJORITY OF WORK ORDERS

- **ELECTRICAL**
- **PLUMBING**

The distribution of work orders for the maintenance activities was relatively estimated for each individual building using the below equation.

\[
D_{wb} = \frac{1}{NW} \sum_{i=1}^{n} NW_{bi}
\]

- \(D_{wb}\): The distribution of work orders for each maintenance activity at building \(i\)
- \(NW\): The total number of work orders for each maintenance activity
- \(NW_{bi}\): The number of work orders for each maintenance activity at building \(i\)

MAINTENANCE ACTIVITIES AND BUILDING AGES

Higher (H): five percent and greater of total work orders (>5%) Lower (L): one percent and less of total work orders (<1%).

Zero (Z): zero work orders (= 0)

<table>
<thead>
<tr>
<th>Maintenance Activity Type</th>
<th>State #1</th>
<th>State #2</th>
<th>State #3</th>
<th>Private #1</th>
<th>School District #1</th>
<th>Private #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical</td>
<td>H L Z</td>
<td>H L Z</td>
<td>H L Z</td>
<td>H L Z</td>
<td>H L Z</td>
<td>H L Z</td>
</tr>
<tr>
<td>HVAC</td>
<td>36 73 47</td>
<td>53 45 32</td>
<td>53 55 46</td>
<td>38 44</td>
<td>53 108 64</td>
<td></td>
</tr>
<tr>
<td>Plumbing</td>
<td>37 77 40</td>
<td>50 47 34</td>
<td>52 51 53</td>
<td>38 47</td>
<td>51 107 104</td>
<td></td>
</tr>
</tbody>
</table>

The analysis does not show that the older buildings receive a higher number of work orders as might be expected.

The average age of the buildings in each cluster is more than the average age of 34.2 years provided on the Sightlines report (2017).

<table>
<thead>
<tr>
<th>Average Age</th>
<th>H</th>
<th>L</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;40</td>
<td>33%</td>
<td>0%</td>
<td>20%</td>
</tr>
<tr>
<td>40 - 60</td>
<td>61%</td>
<td>56%</td>
<td>60%</td>
</tr>
<tr>
<td>&gt;60</td>
<td>6%</td>
<td>44%</td>
<td>20%</td>
</tr>
</tbody>
</table>

MANY ACTIVITIES AND BUILDING TYPES

- **ELECTRICAL**
- **HVAC**
- **PLUMBING**

CONCLUSIONS

- **THE HIGHEST NUMBER OF WORK ORDERS ARE:**
  - **ELECTRICAL**
  - **HVAC**
  - **PLUMBING**

- **THE STUDY DOES NOT REVEAL A SPECIFIC RELATION BETWEEN:**
  - **MAINTENANCE ACTIVITIES AND BUILDING AGES**
  - **MAINTENANCE ACTIVITIES AND BUILDING TYPES**

- **THE STUDY PROVIDES A PRELIMINARY UNDERSTANDING OF:**
  - **THE FREQUENT MAINTENANCE ACTIVITIES IN THE DATA SETS WITH THEIR RELATIONS OF BUILDING AGE AND BUILDING TYPE.**

- **THE DATA SETS NEED THE SUBCATEGORY* OF THE MAINTENANCE ACTIVITIES THAT:**
  - **MAY INCREASE THE EFFECTIVE USE OF WORK ORDER DATA IN THE CONDITION ASSESSMENT PROCESS.**

*Subcategories of the electrical maintenance activities can be: light bulb changing, electrical panel issues, outlet/switch issues, etc.