Hawaii is NO Paradise for Utility Poles…

With conditions like these, how does the Hawaiian Electric Company (HECO) choose the right replacement pole?

- High UV Radiation
- High Humidity
- Frequent Lightning
- High Winds
- Salty Air
- Caustic Volcanic Fog
- Mountainous Terrain
- Formosan Termites

HECO has used Fiber Reinforced Polymer (FRP) poles since the 50’s. By 1987, UV radiation had marred the FRP’s veneer – though poles were still sound. For aesthetic reasons, HECO replaced FRP with wood. Until 2003 HECO used wood, steel and concrete poles.

- EPRI study (2003): Wood pole average life of 20 years. Replacing poles consumes up to 90% of overhead costs. Replacing wood with concrete, steel and fiberglass would free up resources.

HECO assessed FRP using a Feasibility Study, which compared immediate costs and life cycle costs of various materials. As with most utilities, a new product’s success depends on bringing both Engineering and Construction on board and convincing them to use the product. HECO worked to gain the support of all operations and maintenance staff, planners, field estimators, crew chiefs, and Linemen. HECO then acquired several test poles for crews to place and evaluate, and invited the pole manufacturers’ representatives to consult.

As with most utilities, a new product’s success depends on bringing both Engineering and Construction on board and convincing them to use the product. HECO worked to gain the support of all operations and maintenance staff, planners, field estimators, crew chiefs, and Linemen. HECO then acquired several test poles for crews to place and evaluate, and invited the pole manufacturers’ representatives to consult.

<table>
<thead>
<tr>
<th>Pole Material</th>
<th>Weight (lbs.)</th>
<th>Pole Cost ($)</th>
<th>Freight* ($)</th>
<th>Termimesh Anti-termite Cost ($)</th>
<th>Total Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood Pole</td>
<td>2,200</td>
<td>888</td>
<td>350</td>
<td>1,230</td>
<td></td>
</tr>
<tr>
<td>Prestressed Concrete</td>
<td>3,936</td>
<td>3,808 incl n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>3,808 incl n/a</td>
</tr>
<tr>
<td>Pultruded Fiberglass</td>
<td>648</td>
<td>1,289</td>
<td>261</td>
<td>n/a</td>
<td>1,550</td>
</tr>
<tr>
<td>Filament Wound Fiberglass</td>
<td>533</td>
<td>1,479</td>
<td>275</td>
<td>n/a</td>
<td>1,754</td>
</tr>
<tr>
<td>Galvanized Steel</td>
<td>1,170</td>
<td>3,510 incl n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>3,510 incl n/a</td>
</tr>
</tbody>
</table>

Cost Analysis

HECO’s studied both immediate costs and life cycle costs of FRP vs. other materials.

- HECO defined optimal applications for FRP poles:
  - Urban areas where additional groundline clearance is needed for wheelchair access or ADA compliance.
  - Remote areas requiring pole to be set by hand or helicopter. Lighter poles reduce labor cost, offsetting higher material cost. Helicopter shot or hand carry.
  - Brush fire areas

HECO found that FRP poles had these traits:
- Lightest of pole materials of similar strength
- High strength-to-weight ratio
- Easy drift and cut in field with existing tools
- Material inert and stable in any environment
- No chemicals to leach into the environment
- Inherently fire-resistant
- Newer poles now UV-resistant

HECO defined optimal applications for FRP poles:
- Distribution poles in urban areas
- Mountains, requiring helicopter lift and set
- Limited access areas requiring hand carry
- Heavy termite areas
- Caustic industrial/corrosive coastal areas
- Brush fire areas

FEASIBILITY STUDY: Assessing FRP

HISTORY

- HECO had used Fiber Reinforced Polymer (FRP) poles since the 50’s. By 1987, UV radiation had marred the FRP’s veneer – though poles were still sound. For aesthetic reasons, HECO replaced FRP with wood. Until 2003 HECO used wood, steel and concrete poles.

- EPRI study (2003): Wood pole average life of 20 years. Replacing poles consumes up to 90% of overhead costs. Replacing wood with concrete, steel and fiberglass would free up resources.

- As with most utilities, a new product’s success depends on bringing both Engineering and Construction on board and convincing them to use the product. HECO worked to gain the support of all operations and maintenance staff, planners, field estimators, crew chiefs, and Linemen. HECO then acquired several test poles for crews to place and evaluate, and invited the pole manufacturers’ representatives to consult.

- HECO found that FRP poles had these traits:
  - Lightest of pole materials of similar strength
  - High strength-to-weight ratio
  - Easy drift and cut in field with existing tools
  - Material inert and stable in any environment
  - No chemicals to leach into the environment
  - Inherently fire-resistant
  - Newer poles now UV-resistant

- HECO defined optimal applications for FRP poles:
  - Urban areas where additional groundline clearance is needed for wheelchair access or ADA compliance.
  - Remote areas requiring pole to be set by hand or helicopter. Lighter poles reduce labor cost, offsetting higher material cost. Helicopter shot or hand carry.
  - Brush fire areas

- HECO added FRP poles to its inventory, optimizing the use of pole materials and ensuring that the right pole type is used in the right application. Each pole type has its niche as the right material for use in different unique situations. By optimizing the use of the different pole materials, HECO effectively manages the costs of its pole installations.

7 CONCLUSION

HECO added FRP poles to its inventory, optimizing the use of pole materials and ensuring that the right pole type is used in the right application. Each pole type has its niche as the right material for use in different unique situations. By optimizing the use of the different pole materials, HECO effectively manages the costs of its pole installations.