Street Tree Decline and Construction Damage

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Introduction and Background

Urban trees are an important and valuable element to the urban setting. Provide:
- Aesthetics
- Noise Control
- Decrease in energy costs
- Filter air pollution

Introduction and Background

Street construction can damage numerous urban trees. This damage can become very expensive. It is estimated that California spends $70 million annually on street tree damage due to construction.

Planning and Design

When Streets or Sidewalks are Widened and Improved, Tree Spaces Shrink:

Objectives

- Determine long-term effects (20 – 25 years) of street and sidewalk repair on street trees
  - Survivability (Mortality)
  - Tree Health (Condition Rating)
  - Growth (Diameter Change)
- Compare findings from this study to results from short-term study (4 – 8 years) conducted in 1989

Hypotheses

- No difference between undamaged and damaged trees in survival/mortality
- No difference between undamaged and damaged trees in condition rating
- No difference between undamaged and damaged trees in diameter change
Methods

- Known data and tree locations from previous study
- Collected street tree data in Milwaukee, WI in August 2005
- Input data into Microsoft Access
- Evaluate data through statistics (SPSS 14.0)

Data Collected:
- Tree diameter at 4.5 ft
- Sidewalk width
- Construction date
- Condition rating (CTLA System):
  - Roots: 1-5
  - Trunk: 1-5
  - Larger Branches: 1-5
  - Limbs and Branches: 1-5
  - Foliage/Growth: 1-5
- Randomly chosen core samples

Statistics:
- Analysis of Variance
- Multiple Regression Model
  - Lawn Width
  - Damage
  - Tree Condition 1989

Non Apparent Norway Maple Decline Advanced
Results

Table 1. Percent Survival of trees subjected to damage or no damage after 1989.

<table>
<thead>
<tr>
<th></th>
<th>1989</th>
<th>2005</th>
<th>Percent Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damaged</td>
<td>168</td>
<td>136</td>
<td>81.0</td>
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<tr>
<td>Undamaged</td>
<td>502</td>
<td>404</td>
<td>80.5</td>
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</tbody>
</table>

Results

Table 2. Regression Model of the variables Lawn width, Damage, and Tree Condition

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<td>0.433</td>
<td>0.14</td>
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Conclusions

- Accept null hypothesis 1, no difference between undamaged and damaged street trees in survival/mortality over long term (20-25 years).
Conclusions

- Accept null hypothesis 2, no difference between undamaged and damaged street trees in condition rating over long term (20 – 25 years). 
  - But, do see decreasing trend of 3.4 %
  - Regression coefficient Damaged -2.352

Conclusions

- Accept null Hypothesis 3, no difference between undamaged and damaged tree diameter change over long term (20 – 25 years).

Future Research

- Core Samples

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