GIS Based Facility Assessment and Financial Planning

ESRI User Conference

Alamo Community College District & LAN

July 21, 2015
Presentation Agenda

- Alamo College Introduction
- Facilities history of Alamo Colleges
  - Role of Facility Condition Assessment (FCA)
  - Role of FCA in forecasting PM budgets
- First Step Towards GIS
- Leverage Existing Data
- Looking to the Future
Alamo College Background

- Six Campuses Across San Antonio
  - San Antonio
  - St. Philip’s
  - Palo Alto
  - Northeast Lakeview
  - Northwest Vista
  - Southwest
- 64,000 Students
- $450 Million Facilities CIP
- 24 New Buildings
- 5.6 Million Square Feet of Facilities

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Start with Assessment

- Know How Much You Own
  - How many square feet?
  - How many buildings?
- Know The Condition
  - Deferred requirements
  - Projected requirements based on system lifetimes
  - Life safety/code
Assessment Methodology

- Professional Architects
- Professional Engineers
- Data Collection
  - Assessment Software – VFA.facility
Assessment Terminology

- Deficiencies
- Requirements
- Replacement Value
- Facility Condition Index (FCI)

\[
\text{Facility Condition Index (FCI)} = 1 - \frac{\text{Total Cost of Facility Repairs}}{\text{Current Replacement Value (CRV) of Facility}}
\]
Forecasting: Making the Case

- Maintain FCI
- Improve FCI
- Specific Annual Funding
- Project-Specific Funding
PREVENTIVE MAINTENANCE: Requirements Breakdown

Top 20 Buildings

193 Buildings
91% of Inventory

41%
$81.2 MM

59%
$117.5 MM

213 Buildings
$199 MM

$199 MM Total Identified Requirements

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Leveraging Existing Data for GIS

- Dipping Toe in the Ocean of GIS
- What Can Be Done with What’s on Hand?
- Obvious Spatial Relationships?
- Not Currently a Large Expenditure
What Data Was Readily Available?

- Facility Condition Indices of Alamo Colleges
- Work Order History
- Classroom Occupancy Utilization

Data Sources
- VFA.facility, FCA Software
  - Annual Maintenance by LAN
- Maximo Work Order Software
  - Maintained by Computerized Facility Integration, LLC
- Classroom Manhours
Data Related Issues

- Different Data Integrity Rules
- Limited Common Attributes
- Noisy Work Order Data
- Varying Spatial Resolution
- Varying Temporal Resolution
- Necessary to Aggregate to Building Level
How to Handle Data Cleanup

- Heavy Data Review
- Attribute Research
- Find Common Attributes
- Semi Automated Scripting
# Data Summary by Campus

<table>
<thead>
<tr>
<th>Campus</th>
<th>Abbreviation</th>
<th>Building Count</th>
<th>Average Facility Age (Years)</th>
<th>Total Work Orders</th>
<th>Average FCI (%)</th>
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</thead>
<tbody>
<tr>
<td>Northeast Lakeview College</td>
<td>NLC</td>
<td>13</td>
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<table>
<thead>
<tr>
<th>Campus</th>
<th>Abbreviation</th>
<th>Building Count</th>
<th>Class Count</th>
<th>Class Man Hours</th>
<th>Work Orders</th>
<th>Average Work Order Time</th>
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<td>Northeast Lakeview College</td>
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</table>

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Desired Data

- Digital Floor Plans
- Higher Spatial Resolution
- Investment Spending at Classroom and Building Level
- Utility and Energy Usage at Building Level

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Finding Relationships

- Excel and GIS Regression Methods
- Exploratory Regression Tool
  - Minimal Spatial Component However...
  - Good Agreement with Excel
  - FCI
Relating Facility Repair to Facility Loading

\[ R^2 = 0.2481 \]

Count of Work Orders

Class Count

Thousands

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Relating FCI to Facility Loading

\[ R^2 = 0.0307 \]

Class Count

NLC, NVC, PAC, SAC, SPC, SWC

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Exploring Building Loading
Relating FCI to Facility Repair

![Graph showing the relationship between FCI and the count of work orders. The graph includes data points for various categories such as NLC, NVC, PAC, SAC, SPC, and SWC. The R² value is 0.097.](image)

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Relating FCI to Facility Age

\[ R^2 = 0.5293 \]

![Graph showing the relationship between FCI and Age of Facility (years)]
What Questions Still Remain?

- How can the analysis change with more data?
- Why are work orders between campuses so different?
- Can stronger spatial relationships be developed with more data?
Looking To the Future

- Expand GIS
- Improved Facility Mapping
- Asset Mapping
Expand GIS

- Incrementally Implement BISDM Data Model
  - BISDM Multi-Level Detail
    - Currently – Campuses, Building Points and Footprints
    - Next – Floors Plans, Assets
    - Future – Utilities, HVAC, Transportation Routing
  - Implement Based on Need and Usefulness
    - Utility Mapping
    - Risk Management Applications
    - Campus Layout Analysis
Improved Facility Mapping

- Integrate Maximo Spatial Components
  - Improve ROI by fully utilizing spatial data integration
  - Mobile Work Order System
    - Real time resource management
    - Nimble Prioritization
    - Easily Identify Service Duplication
Contact Information

John Strybos, PE, Associate Vice Chancellor of Facilities
  jstrybos@alamo.edu

Matt Manges, PE, CFM
  MJ Manges@lan-inc.com
  713.821.0366

JP Grom, AIA, LEED, AP, PMP
  JPGrom@lan-inc.com
  979.776.1000

Fergus Graham, PE
  FMGraham@lan-inc.com
  713.821.0416