Sustaining Infrastructure by leveraging ISO/TC 211 standards using Bentley solutions...

Alain Lapierre
Agenda

• Why Sustaining Infrastructure?
• Why Bentley users care?
• How ISO/TC211 can help?
• Review of some Use Cases
• Conclusion
Agenda

• Why Sustaining Infrastructure?
• Why Bentley users care?
• How ISO/TC211 can help?
• Review of some Use Cases
• Conclusion
Infrastructure Challenge...

- 27% of U.S. Bridges Are Deficient
- 3,500 Dams Are Declared Unsafe
- 33% of Our U.S. Roads Are in Poor or Mediocre Condition
- 34% of Sewage Treatment Plants Are in Poor Condition

- Current infrastructures are deficient...
- Demand for New infrastructures is BIG:
  - More than 50% of world population live in cities today
  - Plan an increase of 2 billion in 25 years
  - Infrastructure « deficit » estimated $40,000 billion USD
Where?

Exhibit 1: The Infrastructure Challenge

Percentages of total projected cumulative infrastructure investment needed during the next 25 years to modernize obsolescent systems and meet expanding demand, broken down by region (rows) and sector (columns).

Middle East
$0.9T

Africa  $1.1T

U.S./Canada  $6.5T

South America/Latin America  $7.4T

Europe  $9.1T

Asia/Oceania  $15.8T

Total projected cumulative infrastructure spending 2005–2030: $41 trillion

<table>
<thead>
<tr>
<th>Region</th>
<th>Water</th>
<th>Power</th>
<th>Road and rail</th>
<th>Air/seaports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle East</td>
<td>$22.6T</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Africa</td>
<td></td>
<td>$9.0T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S./Canada</td>
<td></td>
<td></td>
<td>$7.8T</td>
<td></td>
</tr>
<tr>
<td>South America/Latin America</td>
<td></td>
<td></td>
<td></td>
<td>$1.6T</td>
</tr>
<tr>
<td>Europe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asia/Oceania</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Booz Allen Hamilton, Global Infrastructure Partners, World Energy Outlook, Organisation for Economic Co-operation and Development (OECD), Boeing, Drewry Shipping Consultants, U.S. Department of Transportation
Why Sustaining Infrastructure?

If we agree that appropriate Infrastructure is important for our global quality of life, 
...we need to maximize sustainability...
Agenda

• Why Sustaining Infrastructure?
• Why Bentley users care?
• How ISO/TC211 can help?
• Review of some Use Cases
• Conclusion
Who is Bentley Systems?

World’s leading provider of software for infrastructure design, construction and operations:

- #1 in Building Performance
- #1 in Structural Engineering
- #1 in Water Modeling
- #1 in Roads and Transit Design
- #1 in Bridge Engineering
- #1 in Plant Operations
- #2 in Geospatial Software

Global Business:
- Over 2,800 colleagues in 45 countries
- $500M revenues
Bentley Users’ Industries

• Intra-operable software product portfolio of more than 140 products...
Bentley’s Mission

Provide solutions to Design – Build – Operate the world’s infrastructure with the goal of sustaining:

**Sustaining Infrastructure**

*By Bentley White Paper*

S. B. Carnell, Ph.D.
Senior Vice President
Bentley’s Applied Research Group
April 2009

*Introduction*

The mission of Bentley Systems is to bring the world’s infrastructure to life through the development of software solutions that improve the productivity, quality, and sustainability of designs and projects. To achieve this goal, Bentley provides a comprehensive suite of applications to support the entire lifecycle of infrastructure projects. Whether it is planning, design, construction, or operation, Bentley Systems helps make infrastructure smarter and more sustainable.

- **Society**
- **Environment**
- **Profession**

© 2009 Bentley Systems, Incorporated
Agenda

- Why Sustaining Infrastructure?
- Why Bentley users care?
- How ISO/TC211 can help?
- Review of some Use Cases
- Conclusion
How standards can help?

“Our industry’s inability to communicate effectively has created tremendous waste and inefficiency, estimated at up to 30 percent of the total cost of each building project.”
How ISO standards can help?

How ISO’s technical programme and standards contribute to a sustainable world

- environmental integrity
- social equity
- economic growth

ISO contributing to a sustainable world

- Buildings (TC 59, 71, 163)
- Energy (TC 180, 197, 203, 108)
- Environnement (TC 207, 43, 142, 146, 207, 190, 147)
- Fire Safety (TC 21, 92)
- Food (TC 34)
- Health (TC 215)
- Transport (TC 8, 104, 204)
- Water (TC 224, 147, 30)
- ...
- ... but what about TC 211?
Agenda

- Why Sustaining Infrastructure?
- Why Bentley users care?
- How ISO/TC211 can help?
- Review of some Use Cases
- Conclusion
Review of some Use Cases

1. Finnish municipalities
2. Finding efficiently using Linear References
Finnish municipalities

City planning
- About 300 municipalities in Finland
- Municipalities create City Plans
- Involve multiple departments
- Outsource a lot of work to architects, engineers, construction
- Were using 8 different file formats
  - Conversions cost
  - Only graphic, quality?
  - Inefficiencies
Finnish municipalities

Innovative process
- Local govt organization collected 1.1M € from >200 municipalities
- Funded a project involving software providers for designing the format and supporting it
- Selected:
  - ISO 19136 Geography Mark-up Language (GML)
  - KuntaGML Base Map
  - KuntaGML City Plan Map
  - ISO 19128 Web Map Server Interface
  - ISO 19142 Web Feature Service
Import/Export KuntaGML (ISO 19136)

- To any authorized partner, either internal or external
- One rich format instead of 8 graphic only formats
Publish with Web Map Server (ISO 19128)

- For exploring City Maps and Layers
- Can be used in a portal prior to use the KuntaGML download service
- For registering in catalogs
  - Paikkatietoikkuna
  - INSPIRE
Publish in Web Feature Server (ISO 19142)

- For accessing features/properties
- For registering in catalogs
  - Paikkatietoikkuna
  - INSPIRE
- No editing plans in the short term
Finnish National Geoportal pilot project

- Part of the Inspire implementation in Finland
- Will harvest municipalities data

https://www.paikkatietoikkuna.fi/web/EN
Linear Referencing

- Used for referencing a point or segment along a linear feature like a road, rail or pipeline

- Represented by a myriad of linear referencing methods
ISO 19148

- Generalized model for representing any LR methods

- Facilitate translation between them and allow finding EFFICIENTLY... and avoids costs...
Finding efficiently using Linear References
Finding efficiently using Linear References
Finding efficiently using Linear References
ISO/TC 211 standards and Bentley

<table>
<thead>
<tr>
<th>Bentley product</th>
<th>ISO/TC 211</th>
</tr>
</thead>
<tbody>
<tr>
<td>MicroStation</td>
<td>WMS client (19128)</td>
</tr>
<tr>
<td>Bentley Map</td>
<td>GML import/export (19136)</td>
</tr>
<tr>
<td></td>
<td>Soon WFS client (19142)</td>
</tr>
<tr>
<td>Geo Web Publisher</td>
<td>WMS client &amp; server (19128)</td>
</tr>
<tr>
<td></td>
<td>WFS server (19142)</td>
</tr>
<tr>
<td>Geospatial Server</td>
<td>Linear Referencing (19148)</td>
</tr>
</tbody>
</table>
Conclusion

• Sustaining our infrastructure is a key component towards a sustainable world, for all of us...

• The use of standards, in particular TC211, makes the process of designing-building-operating our infrastructures more efficient.

Thank You!

Alain.Lapierre@bentley.com