Effective Automatic Creation of an Intelligent Model for Road Infrastructure

Alina Yusupova
Head of Projects, INFARS

Alexey Shcherbachev
BIM Manager, INFARS
About the speaker

Alina Yusupova

Head of projects and BIM specialist in INFARS
Master degree in Civil Engineering (MGTU)
Based in Moscow, Russian Federation
9+ years of AEC industry experience
Author and instructor of 10 courses in Civil 3D
Autodesk Certified Instructor
Autodesk Certified Professional
Best speaker of Autodesk University Russia in 2013 and 2014 years
First speaker from Russia at Autodesk University Las Vegas
LinkedIn: https://www.linkedin.com/in/alina-yusupova-82917677/
About the speaker

Alexey Shcherbachev

BIM manager in INFARS
Master degree in Design Engineering (MGSU)
Based in Moscow, Russian Federation

8+ years of AEC industry experience
8+ years in Structure engineering
2+ years in Autodesk VAR
Author and instructor of 5 courses in Autodesk Revit
Certified Instructor
Autodesk Certified Professional
WE ARE INTERESTED IN JOINT IMPLEMENTATION OF INVESTMENT AND CONSTRUCTION PROJECTS IN COOPERATION WITH OUR CLIENTS AND PARTNERS

INFARS WAS FOUNDED

1994

SUCCESSFULLY REALIZED PROJECTS

120

SPECIALISTS GRADUATED FROM OUR TRAINING CENTER

15,000

AWARDED AS A LEADER IN REVIT COURSES

2019
TRAINING CENTER
BIM / CAD / Structural analysis courses

- **45 UNIQUE COURSES FOR ENGINEERS AND MANAGERS**
- **ONLINE AND OFFLINE COURSES AVAILABLE**
- **ENGLISH SPEAKING AUTODESK INSTRUCTORS**
- **SPECIAL EDUCATIONAL MODEL “BIM-BA” FOR EFFECTIVENESS AND PRACTICUM**

BIM-BA
Agenda

• Creation of road signs with «universal» families in Revit
• Organization a GIS system of a traffic management plan in Civil 3D - InfraWorks
• Management of the connection between 2D plan in Civil 3D and Navisworks model
• Creation of 3D guardrail in Civil 3D
• Creation of parametric barriers in Inventor and applying them to roads in InfraWorks
Creation of road signs with «universal» families in Revit
«Universal» road sign family
How does «Universal» road sign family works

Signs

Stand

Foundation
How does «Universal» road sign family works
Why «Universal» road sign family?

• Textures of any sign are available in free sources
• Creating any sign is very quick and easy.
• Revit models looks better in InfraWorks and Navisworks
Creation of a new assembly

https://youtu.be/VAni0bzDXMQ
Creating a new type of sign

https://youtu.be/06yS6WnQLh0
«Universal» road sign family
Management of the connection between 2D plan in Civil 3D and federated BIM model in Navisworks
Preparation of data in Civil 3D plan

Civil 3D plan

InfraWorks model

Navisworks model
Create dynamic block of road sign

https://youtu.be/XXjwsGPMx8I
Place blocks on the Plan
Export data
<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>FULL NAME</td>
<td>Position X</td>
<td>Position Y</td>
<td>Position Z</td>
<td>PROPORTIONAL SIGNS</td>
<td>Ty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>2_2_2_60</td>
<td>0020123</td>
<td>523876432</td>
<td>6445522</td>
<td>30</td>
<td>65,60000</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4_1_2_2_1</td>
<td>0020135</td>
<td>52387668</td>
<td>6445528</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>4_1_2_2_1</td>
<td>0020121</td>
<td>52387667</td>
<td>6445535</td>
<td>30</td>
<td>65,60000</td>
<td>51</td>
</tr>
<tr>
<td>5</td>
<td>4_1_1_6_1</td>
<td>0020135</td>
<td>52387668</td>
<td>6445536</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>4_1_2_2_2</td>
<td>0020135</td>
<td>52387668</td>
<td>6445534</td>
<td>30</td>
<td>65,60000</td>
<td>51</td>
</tr>
<tr>
<td>7</td>
<td>5_1_1_5_0</td>
<td>0020135</td>
<td>52387668</td>
<td>6445539</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>5_1_1_5_0</td>
<td>0020135</td>
<td>52387668</td>
<td>6445533</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>5_1_1_5_0</td>
<td>0020135</td>
<td>52387668</td>
<td>6445533</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>5_1_1_5_0</td>
<td>0020135</td>
<td>52387668</td>
<td>6445533</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>12</td>
<td>5_1_1_5_0</td>
<td>0020135</td>
<td>52387668</td>
<td>6445533</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>13</td>
<td>5_1_1_5_0</td>
<td>0020135</td>
<td>52387668</td>
<td>6445533</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>5_1_1_5_0</td>
<td>0020135</td>
<td>52387668</td>
<td>6445533</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>5_1_1_5_0</td>
<td>0020135</td>
<td>52387668</td>
<td>6445533</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>5_1_1_5_0</td>
<td>0020135</td>
<td>52387668</td>
<td>6445533</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>17</td>
<td>5_1_1_5_0</td>
<td>0020135</td>
<td>52387668</td>
<td>6445533</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>18</td>
<td>5_1_1_5_0</td>
<td>0020135</td>
<td>52387668</td>
<td>6445533</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>19</td>
<td>5_1_1_5_0</td>
<td>0020135</td>
<td>52387668</td>
<td>6445533</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>5_1_1_5_0</td>
<td>0020135</td>
<td>52387668</td>
<td>6445533</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
<tr>
<td>21</td>
<td>5_1_1_5_0</td>
<td>0020135</td>
<td>52387668</td>
<td>6445533</td>
<td>30</td>
<td>65,60000</td>
<td>5</td>
</tr>
</tbody>
</table>
Dynamo script
Dynamo script

https://youtu.be/C746Zb6fwcg
Organization a GIS system of a traffic management plan in Civil 3D and its effective transfer to InfraWorks model
Organization a GIS system in Civil 3D and import to InfraWorks

https://youtu.be/pwv8Kr_V1Yc
Making changes
Creation of 3D guardrail in Civil 3D
Creation of 3D guardrail in Civil 3D

1. Create 3D model of post and closed polyline of rail profile
2. ARRAY or MEASURE for placing 3D models of posts along the line
3. SWEEP closed polyline of rail profile for creating a rail
Creation of 3D guardrail in Civil 3D
Creation of terminal anchor section guardrail
Creation of terminal anchor section guardrail
Creation of guardrail terminal end wing

Flared end wing (photo)

Feature line with an arc at the end

3D model of flared end wing in Navisworks
Creation of parametric barriers in Inventor and applying them to component roads in InfraWorks
Create parametric barriers in Inventor
Import to InfraWorks

https://youtu.be/9H4ubZc-jI0
THANK YOU!

Alina Yusupova

yusupova@infars.ru

alin.yusupova

www.infars.ru