Requirements

- All relevant information should be available in the BIM model (with some exceptions)
- Revisions and cross disciplinary checks must be handled in the models
- Every object must be classified according to predefined system (for the database of NyeVeier)
Bridges
Tunnels
Work flow in Grasshopper

Data flow through scripts

**Bridge beam reinforcement**

<table>
<thead>
<tr>
<th>INPUT</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross section, surfaces and lines for structural elements</td>
<td>Tekla reinforcement of bridge beam</td>
</tr>
<tr>
<td>Element numbering groups</td>
<td>Boundary conditions</td>
</tr>
</tbody>
</table>

**Bridge beam and columns**

<table>
<thead>
<tr>
<th>INPUT</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road lines from Autocad</td>
<td>Road and axis placements</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Volume, cross sections and centerline of columns, bridge beam and foundations</td>
</tr>
</tbody>
</table>

**Seyle-armering**

<table>
<thead>
<tr>
<th>INPUT</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross section columns and other relevant lines, cs, a, mm.</td>
<td>Tekla reinforcement of columns</td>
</tr>
</tbody>
</table>

**Main**

This workflow is used instead of adding objects as shapes in teka to keep original attributes of object.
Building from BIM

Requires:

• Some extra drawings like overview drawing (demanded by SVV and asked for by contractor)
• Additional objects to get well structured geospatial data of curved objects
• Well organized attributes
• Well organized and simplified reinforcement
Automation of IFC presentations

Automated dimension lines

Automated markup
This method was unfortunately too complex for PEAB and was not used by the contractor.
Reinforcement and pos.num.

- Big focus on reducing the number of pos. num. as much as possible
- Created system to ensure pos.num. did not change between revisions.
- Creating bars as rebar groups
Classification and information takeoff

- Classification to separate layers
- Variation of lap length to reduce the required number of different rebars.
Quality assurance

Comparing revisions through

- Rule checking
- Predefined check list
- Information takeoff of total weights
- Reports generated to excel for automated colouring of changes.
As built images