Methods of Working

Novapoint Railway is an efficient and suitable tool for different project phases. The following cases may give you some ideas how to succeed with your railway design. The suggested steps to go are just a guideline.

Feasibility studies

The main goal is to evaluate as many alternative routes as possible between A and B.

Suggested steps to go:

- Establish the project database and import the terrain data for the actual corridors to be studied, based on digitised maps, maps with contours, buildings, road, restricted areas, or other 3D terrain data.
- In the project ID dialog, define the different railway model alternatives to be studied.
- Design the horizontal and vertical alignments for each alternative:
- Use curves and transition lengths with no less values than the minimum for the defined design speed.
- Cant and element speed not necessary to specify.
- For double track lines only one reference track is required.
- Save the alignment with unique identifications in the project database.
- Specify the track data, with the reference track location and the fixed track distance if double track.
- Specify the typical cross-section settings in the Standard cross-section wizard and calculate the complete model.
- Calculate the substructure quantities in the railway model.
- Present the result in the plan, longitudinal and cross-section drawings.
- Present the alternative in a virtual 3D model.
- Optimize the alternative with regards to quantities/cost estimates, affected areas and buildings, noise and environmental impacts ++
- Continue with the next alternative.

Preliminary design

The main goal here is to work out a more detailed and accurate design of selected alternative(s) from the feasibility study phase.

Suggested steps to go:

More or less the same steps as for Feasibility studies, but with more focus of required details for the horizontal alignment. Also more details are required for the model, e.g. sub-surface layers, drainage, the side areas, quantities, and constructions.

- Design of the horizontal alignment:
- Design both the right and the left track if double track line. A tip is to use the Alignment Design tool Copy and offset to easily define the second track with the specified track distance * Specify cant (super elevation) and element speed for both tracks
- Optimize the alignments using the different parameter columns.
- Save the alignment(s) with unique identifications in the project database.

- Design of the vertical alignment, at least for the reference track if double track line.
- Specify the track data for both left and right track if double track. * Specify which track is the reference track.
- Mark if only the reference track vertical alignment is to be used.
- Verify the cant settings (for both tracks if double track).
- Eventually import from the alignment design or manually define the design speed to be presented on the vertical alignment drawings.
- Specify the typical cross-section settings in the Standard cross-section wizard and calculate the complete model.
- User-specify more substructure and side area details in the railway model if required.
- Calculate the substructure quantities in the railway model.
- Present the result in the plan, longitudinal and cross-section drawings.
- Present the alternative in a virtual 3D model.
- Optimize the alternative with regards to quantities/cost estimates, affected areas and buildings, noise and environmental impacts ++

Detailed design □ □From A to Z□

For detailed railway design more or less all the tools in the Novapoint Railway drop-down menu are to be used, except the NovaTrack/Alignment design from Surveyed data tool.

Suggested steps to go:

More or less the same overall steps as for Preliminary Design, but with even more focus on the horizontal and vertical alignments. All modelling details, platforms, constructions, drainage, the side areas, quantities, stake-out data, ++ to be designed.

- Detailed 3D alignment design must be carried out for both tracks if double track line.
- In track data, both tracks must be specified and vertical alignment to be used for both tracks. Cant settings must be verified for both tracks
- The Standard cross-section wizard must be run, * In the case the railway model for the substructure already is approved and is ok, but changes have been made to the cant details, only the calculation option Calculate ballast is required. This will update the ballast description with the correct cant settings.

Detailed design □ without track design

Some railway authorities prefer to separate the detailed railway alignment design from the substructure and ballast design. In these cases the horizontal and vertical alignment data must be imported and the corresponding cant (superelevation) data described separately.

Suggested steps to go:

- Establish the project database and import the horizontal and vertical alignments. Novapoint can import * A number of different formats can be imported using:
- The Novapoint Base □ Terrain model □ Import tools.
- Using Alignment Design □ Object ;□ Import from file tool.
- Selected alignments must be defined with a unique id and saved with feature code (e.g. 7003) in specified group.
- The cant settings must then be described for each horizontal curve element, either in
- Alignment Design in the Cant column.

- Manually in Track Data Cant settings on selected objects already saved in the database.
- From here the steps to continue the detailed railway design are the same as for the From A to Z description.

Rehabilitation and Track optimisation

Alignment Design from Surveyed Data, or NovaTrack, is a powerful tool for detailed optimisation, adjustment and alignment calculation of exiting railway tracks. Using NovaTrack, it is possible to have a complete overview of the deviation between exiting track and alignment calculation within the design phase.

NovaTrack analyses measured or surveyed point for left and right rails along existing track. The program generates a first suggestion for both horizontal and vertical alignment through theses points. The quality of the alignment compared to the measured points, is illustrated in different diagrams. In the editing phase, these diagrams are used for reviewing the alignment.

Suggested steps to go, Track Optimisation:

- Import the surveyed data for the rails in NovaTrack (Alignment Design from Surveyed Data).
- Optimize the horizontal and the vertical alignments using all the editing tools in NovaTrack.
- Create alignment reports in NovaTrack for e.g. Plasser & Theurer tamping machine, or other alignment formats available.

Suggested steps to go, Rehabilitation:

- Import the surveyed data for the rails in NovaTrack.
- Optimize the horizontal and the vertical alignments where the new alignment is to follow existing tracks
- Continue with the detailed design in Novapoint Railway using the optimised alignments from NovaTrack as basis for the further work.

Note: There are no options to save data directly from NovaTrack to the database. The alignment must be imported to the database as described for 'Detailed design without track design'.