Equivalent Conicity Calculation Program

User's manual

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1. **Introduction**
Equivalent Conicity is a parameter that is used when investigating dynamic interaction between railways vehicle and track. The parameter describes behavior of contact between wheels and rails for straight and large radius parts of track.

2. **Calculated parameters**
The program calculates the next parameters:
- Contact points position.
- Rolling radiuses difference depending on displacement of wheel set.
- Contact angles and their difference depending on displacement of wheel set.
- Equivalent Conicity.
Calculations are made in accordance with EN 15302.

3. **System requirements, installation and activation**

3.1. **Hardware and software requirements**
The main requirements for using Equivalent Conicity Calculation Program:
- Operating system Windows XP and later.

3.2. **Installation**
Before starting the installation, read the following information.
Equivalent Conicity Calculation Program can be installed via two different ways:
- Downloading a standalone setup package (`EquivalentConicitySetup_offline.exe`). Please note: the package contains a version of Equivalent Conicity Calculation Program available on the publishing date.
- Setting up via the internet (`EquivalentConicitySetup_online.exe`). In this case setup will download and install the latest build of Equivalent Conicity Calculation Program.

Download links of the latest versions:
http://riftek.com/media/rit/repos/installers/EquivalentConicitySetup_online.exe
http://riftek.com/media/rit/repos/installers/EquivalentConicitySetup_offline.exe

Upon successful download please run downloaded executable (setup file `EquivalentConicitySetup_online.exe/EquivalentConicitySetup_offline.exe`) as administrator.

The installation is performed by the specially created installer.
When you run the installation, Welcome Window appears:
Click **Next** to continue with the installation and follow the guidelines in dialog boxes of the installer.

**To update** the program, you can use the tool, that was installed with Equivalent Conicity Calculation Program. It can be found in the list of installed programs:

![Equivalent Conicity Calculation Program](image)

### 3.3. Activation

Upon successful installation run the program and complete the Product Activation form:

![Product Activation](image)

**Customer information:**
- **Full Name** - Customer's representative name.
- **Company** - Customer's company name.
- **Postal Address** - Customer's postal address.
- **E-mail** - Customer's e-mail.
- **Country** - Customer's country.
- **Activation Key** - software activation key.

After completing the form, click **Activate**.

### 4. Data-in

The program uses profiles of wheels and rails as a data-in. Table description of the profiles has to be placed in files with the next names:

<table>
<thead>
<tr>
<th>Profile</th>
<th>File name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left wheel profile</td>
<td>WheelL.csv</td>
</tr>
<tr>
<td>Right wheel profile</td>
<td>WheelR.csv</td>
</tr>
<tr>
<td>Left rail profile</td>
<td>RailL.csv</td>
</tr>
<tr>
<td>Right rail profile</td>
<td>RailR.csv</td>
</tr>
</tbody>
</table>
4.1. Coordinate systems

Wheel profile has to be described in coordinate system shown on the next picture:

![Coordinate system for rail profile description](image)

Coordinate system for rail profile description is shown below:

Examples of profiles description:

<table>
<thead>
<tr>
<th>Wheel</th>
<th>Rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>-70</td>
<td>9.519</td>
</tr>
<tr>
<td>-69</td>
<td>15.844</td>
</tr>
<tr>
<td>-68</td>
<td>18.351</td>
</tr>
<tr>
<td>-67</td>
<td>20.196</td>
</tr>
<tr>
<td>-66</td>
<td>21.685</td>
</tr>
<tr>
<td>-65</td>
<td>22.936</td>
</tr>
<tr>
<td>-64</td>
<td>24.011</td>
</tr>
<tr>
<td>-63</td>
<td>24.947</td>
</tr>
<tr>
<td>-62</td>
<td>25.747</td>
</tr>
<tr>
<td>-61</td>
<td>26.392</td>
</tr>
<tr>
<td>-60</td>
<td>26.909</td>
</tr>
<tr>
<td>-59</td>
<td>27.314</td>
</tr>
<tr>
<td>-58</td>
<td>27.619</td>
</tr>
</tbody>
</table>

4.2. Data sources

The program can use the next data sources:
- Any other profiles files, generated in accordance with the requirements of point 3.1.
5. **Work with program**

Once the program is started the main window emerges.

The tab **Wheel and Rail profiles** displays wheels profiles (red color) and rail profiles (blue color). Profiles files have to be placed in the **Data folder**, in the same directory with **Equivalent Conicity.exe** program.

5.1. **Preparations for calculation**

5.1.1. **Parameters for calculation**

Parameters setting panel is placed in the left part of main window. It is necessary to fill corresponding fields with wheel set and track parameters. Rail inclination should match the illustration below. **Result file** parameter is a name of file with calculation results.
5.1.2. Parameters for protocols

In the same panel is a group of parameters used only when generating reports:

![Diagram showing left and right rails with centers of rotation marked]

5.1.3. Input data files

By default, the program uses profiles files placed in the folder Data, in the same directory with Equivalent Conicity.exe program.

You can show other ways to files and download them into program by Load button.
5.2. Calculations

On completing of preparation according to point 4.1. click Calculate button. The calculation results are displayed in the respective tabs:

Equivalent conicity

Rolling radius difference relative to the wheelset displacement
5.3. **Protocols**

To save results, click the **Save as PDF** button, select the path and the file name. To print protocols, click **Print**.

Examples of protocols:
6. **Technical support**

   Technical support is provided through:
   - E-mail support@riftek.com
   - Skype: riftek_support

   When contacting technical support please inform the version of the Equivalent Conicity Calculation Program, and explain the problem.

   The RIFTEK staff supports customers according to the Equivalent Conicity Calculation Program license.