



Module: Noise barrier

Road & Bridge calculations – Noise barrier

Designing data:

Data input :

Results :

1. Selection of the product category
2. General data input area
3. Defining of the fixture details
4. Defining of the anchor's layout
5. Defining of the acting load
6. Analysis of the results
7. Generating the printout



- move to a selected issue

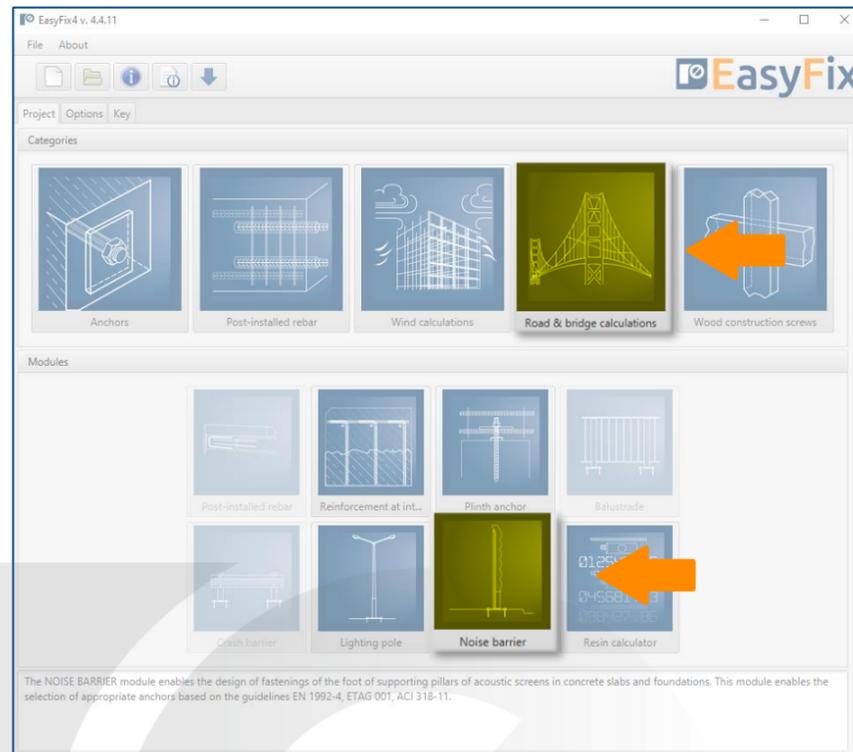


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1

Selection of
The product category



Meaning of icons and symbols:



Create new design



Open file



Safe | Safe as



Undo | Redo changes



Generate pdf printout



Information about software



pl_PL - polski (Polska)

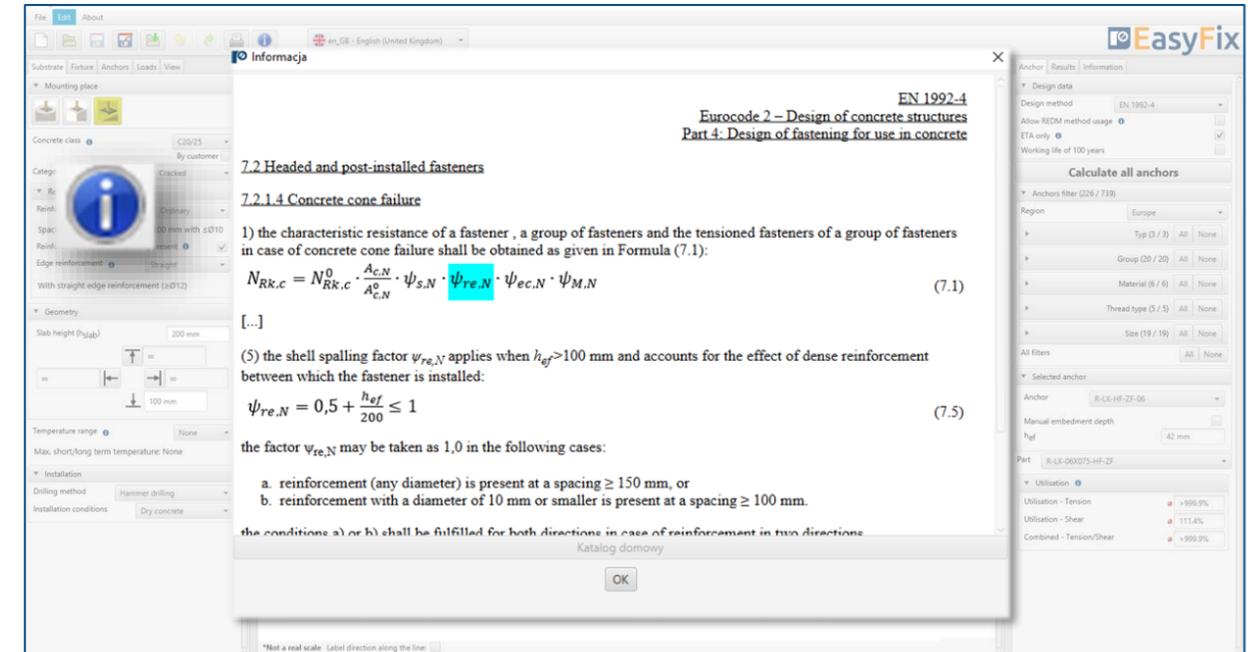
Language selection



Info icons



Instruction manual



Click to **information icon** to display an additional window containing theory related to a particular issue.



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2 General data input area

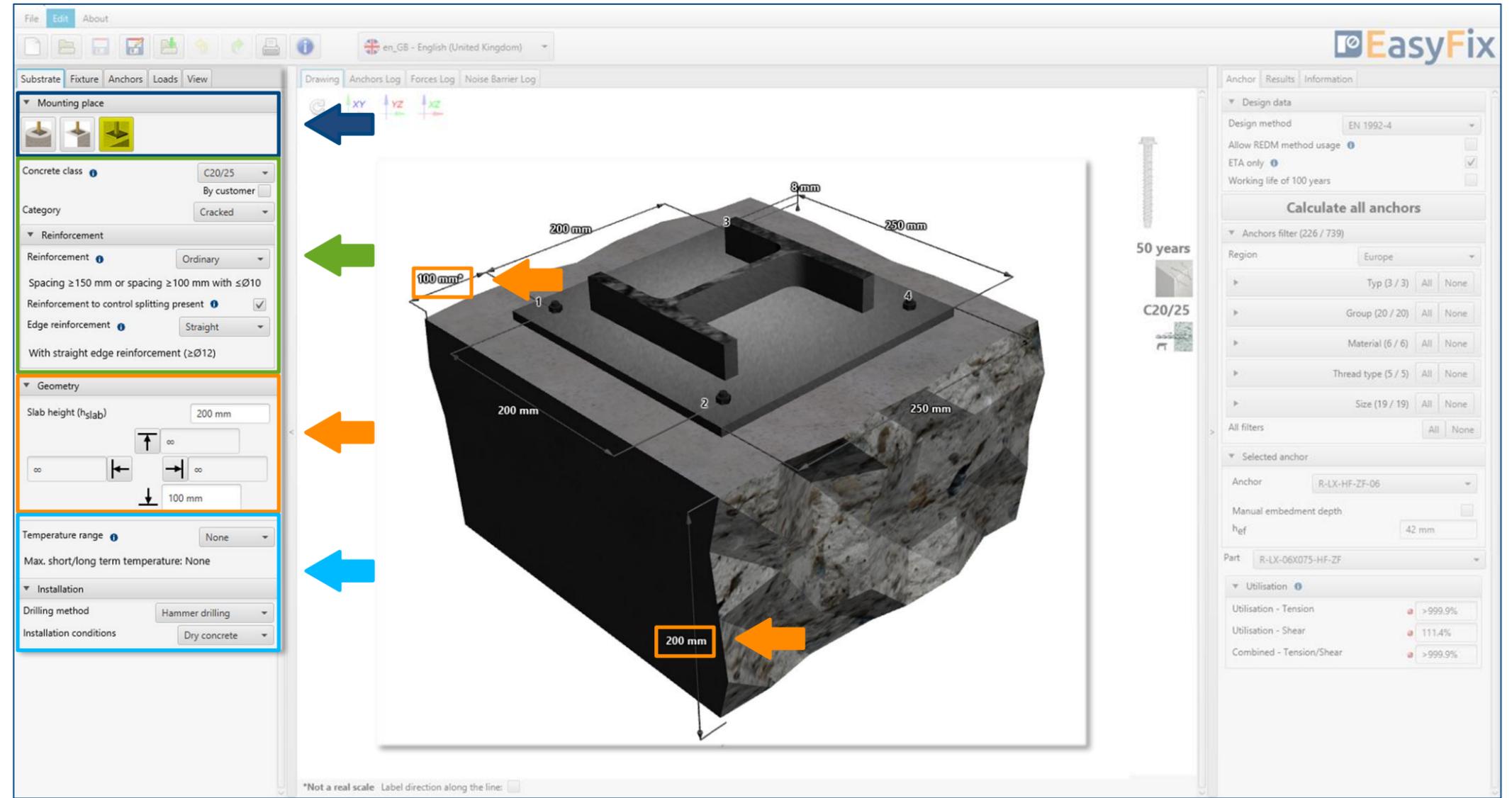
In the **substrate tab**, define the location of the fixture and the type of substrate. This requires knowledge of the details of the concrete class and the exact dimensions of the concrete element. The shape of the ground and the positioning of the base in relation to the edge distance is very important for the final results.

Determining the place of installation:
- On the concrete slab
- On foundation round shape | rectangular shape

Determining of the strength class and type of concrete:
Entering data by selecting from the list or the option "by user".

Determining of the basic structure dimensions: The geometry of the structure can be specified in the side panel or on the model

Determining of the installation:
- Service temperature
- Drilling method
- Concrete conditions





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2 General data input area



Determining of the concrete strength class:

Selecting from the list:
Concrete strength class according to standard EN 206

Option „by user“:
Possibility of manual input of characteristic compressive strength of cylinder f_{ck} or
Possibility of manual input of characteristic compressive strength of cube $f_{ck, cube}$.

Concrete class: C20/25

By customer:

Cracked

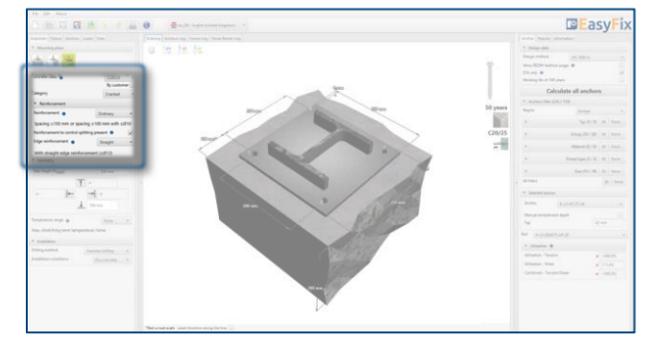
Concrete: Cracked

Category: Cracked

f_{ck}

20 MPa

$f_{ck, cube}$





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2 General data input area



- Determination of drilling method:
Selecting from the list:
 - Hammer
 - Diamond
 - Automatic cleaning
- Determination of assembly condition
Selecting from the list:
 - Dry concrete
 - Wet concrete
 - Flooded holes
 - Sea water
- Determination of service temperature:
Selecting from the list of results filters the proper anchor group.

Temperature range *i* None ▾

Max. short/long term temperature: None

Installation ▾

Drilling method *i* Hammer drilling ▾

Installation conditions Hammer drilling

Temperature range *i* None ▾

Max. short/long term temperature: None

Installation ▾

Drilling method Hammer drilling

Installation conditions ▾

Dry concrete

Dry concrete

Wet concrete

Flooded holes

Sea water

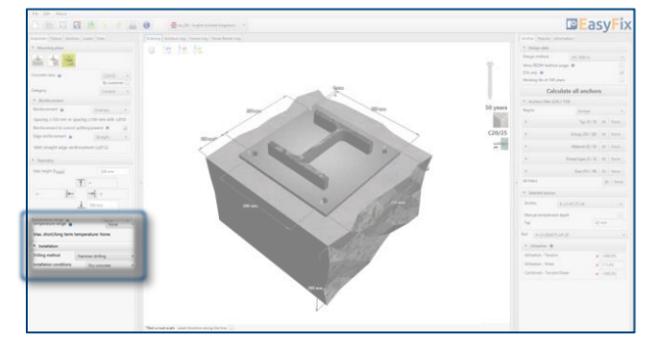
Temperature range *i* None ▾

Max. short/long term temperature: None

Installation ▾

Drilling method Hammer drilling

Installation conditions Dry concrete





Road & Bridge calculations – Noise barrier

3 Defining of The fixture details

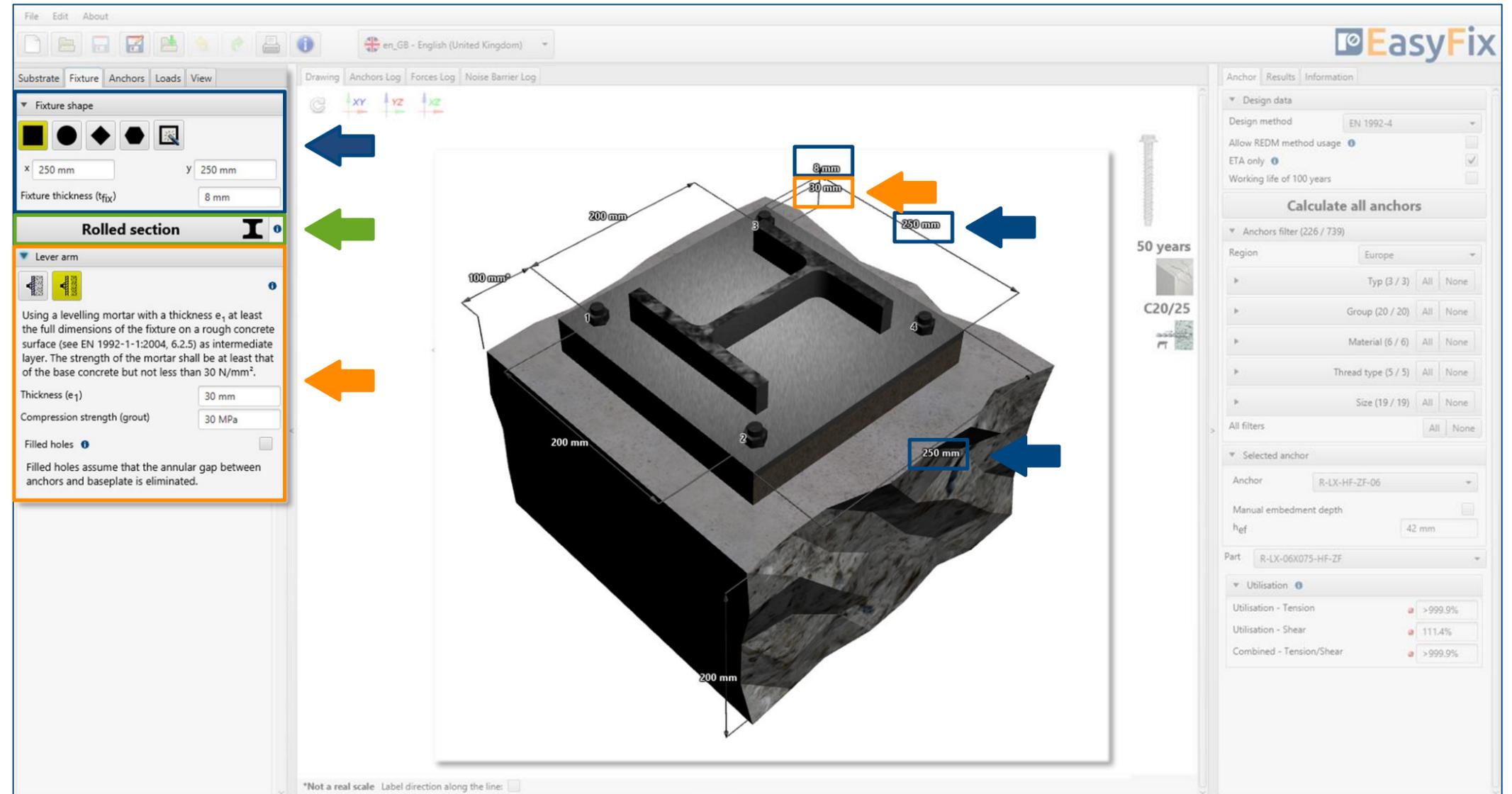


You can use basic shapes to define the geometry of the noise barrier base or use the **by user** option, which allows you to enter freeform shapes. The **Fixture tab** also allows you to enter full information about the installed lamp.

Determining of fixture shape:
The geometry of the base is defined by entering dimensions in the side panel or on the 3D model.

Determining of parameters of rolled section: It opens an additional window in which you must complete the data concerning the mounted element.

Determining of connection type:
Including grout, if exists.





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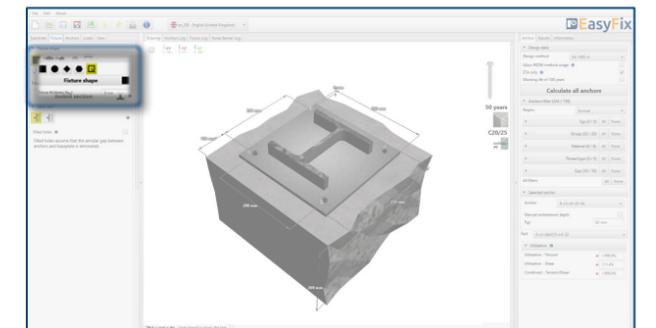
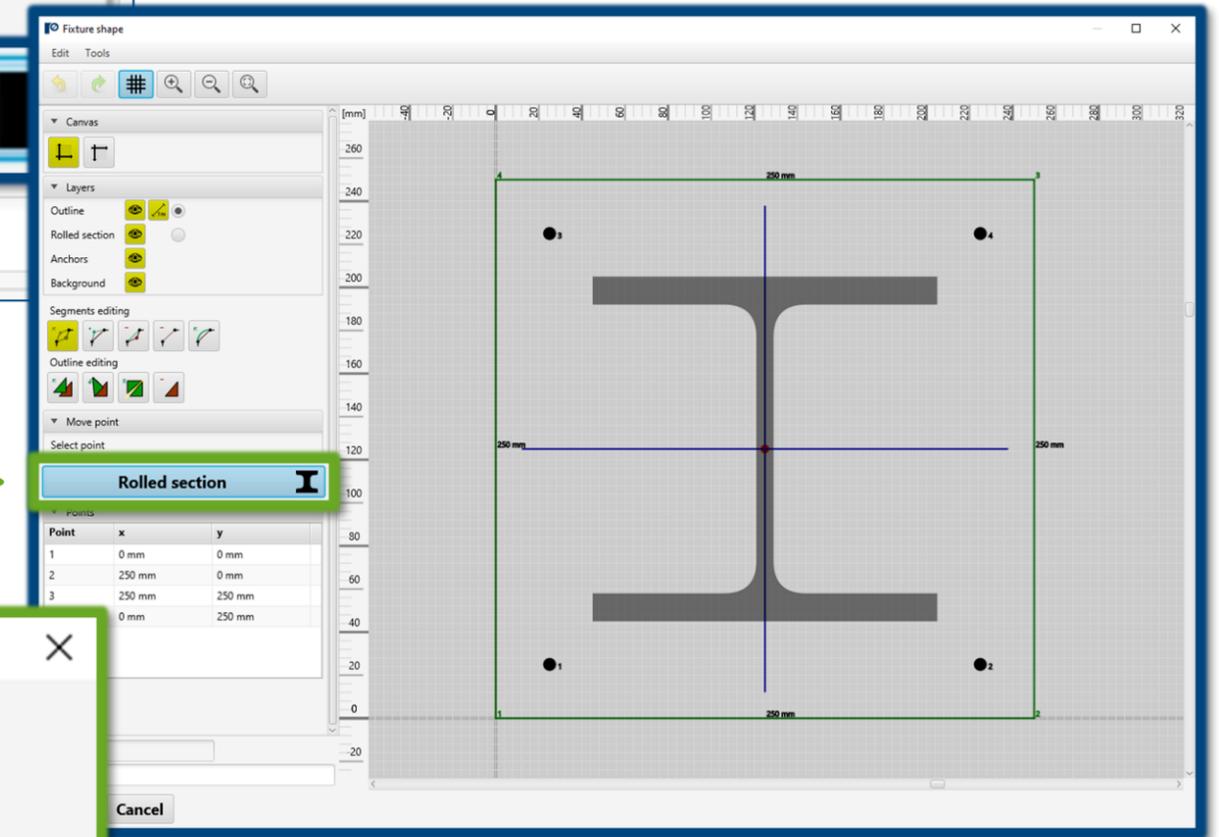
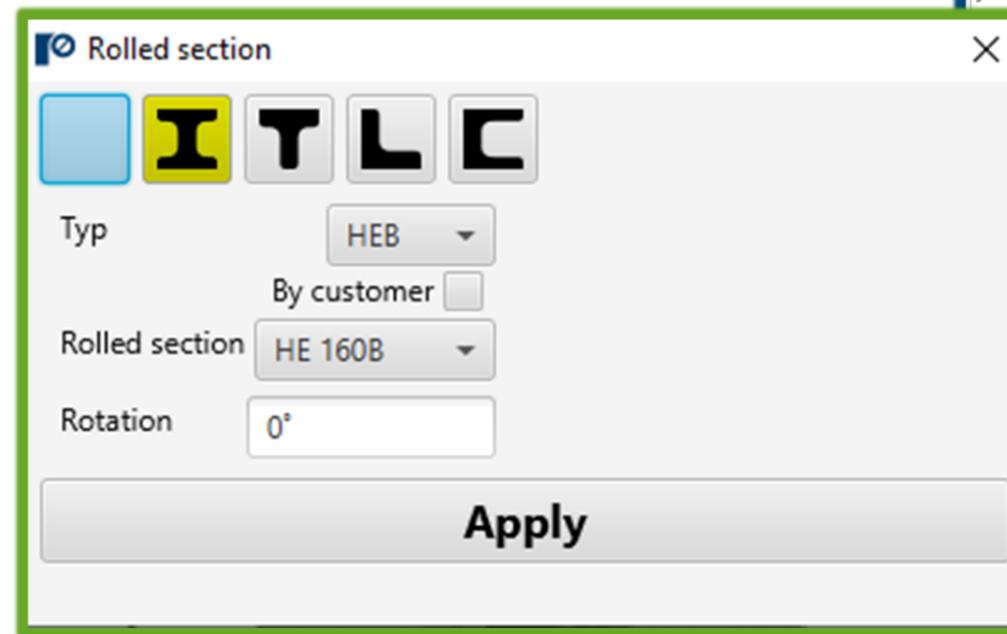
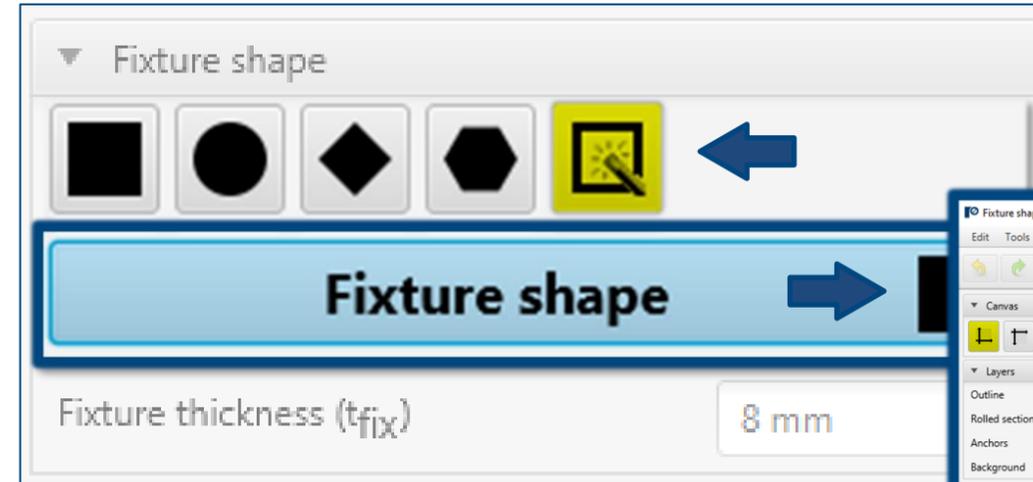
3 Defining of The fixture details

Determining the shape of the base:

The button for creating the shape of the base according to the user opens an additional window in which you can create any shape using the mouse or coordinate points.

Determining the shape of the rolled section:

An additional button for entering the profile parameters generates an additional window in which detailed data concerning the installed element are entered.





Road & Bridge calculations – Noise barrier

4 Definiowanie Układu kotew



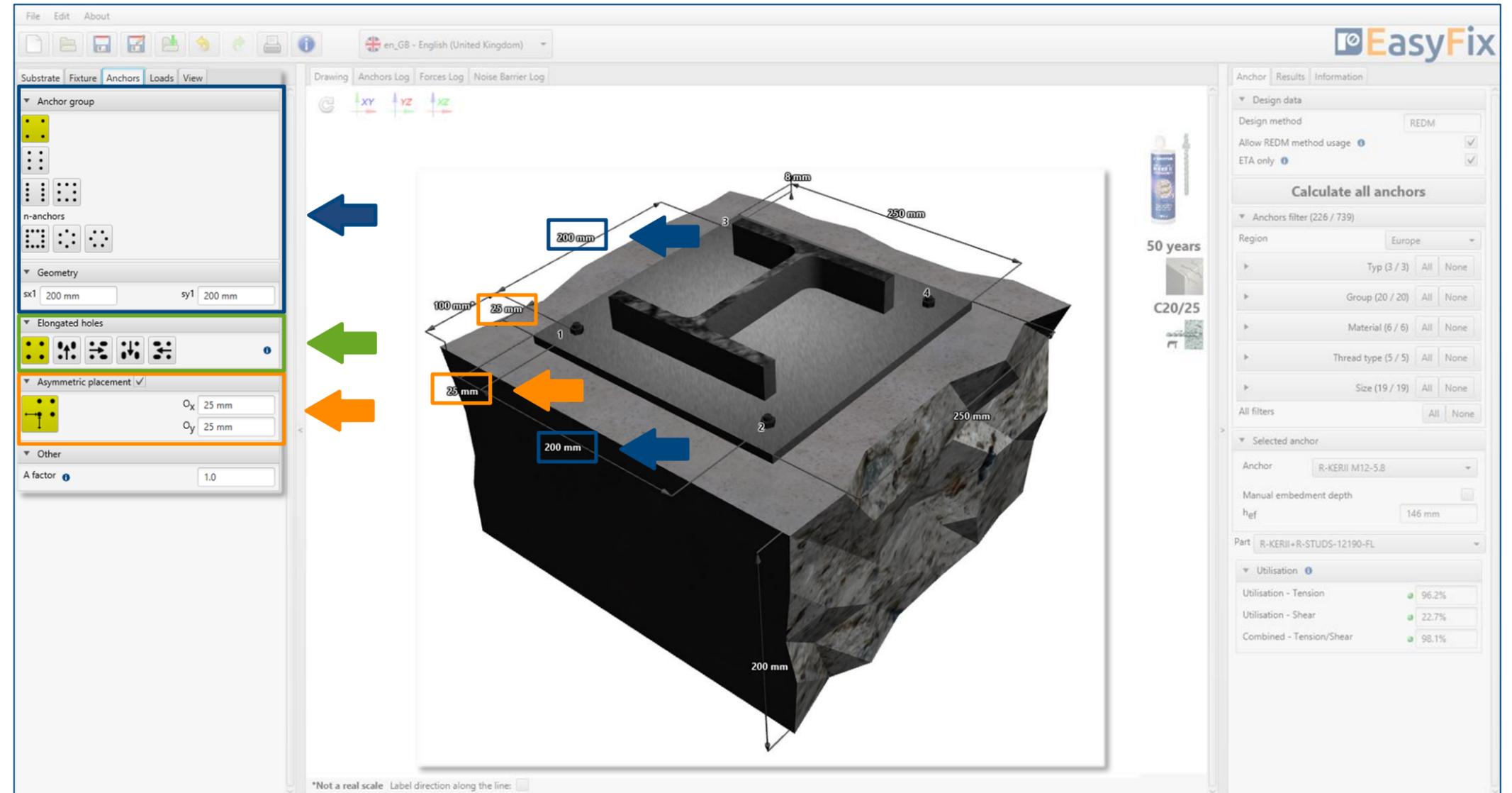
The **Anchors tab** defines the system of anchors with which the section will be attached to the ground. There are several standard distributions that are used in such systems to choose from. It was also possible to take into account the bean holes and the asymmetrical arrangement of the anchors.

Determination of the arrangement and spacing of anchors:

Depending on the layout, the appropriate dimensions are entered in the side panel or on the 3D model.

Consideration of **elongated holes**: Declaring this option changes the distribution of shear forces to the anchors.

Determination of **asymmetrical distribution**: It determines the displacement of the anchor system in relation to the center of gravity of the base.





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5 Defining of The acting load



The loads are determined on the basis of wind loads according to the national annexes to EN 1991-1-4, or entered manually by the user.

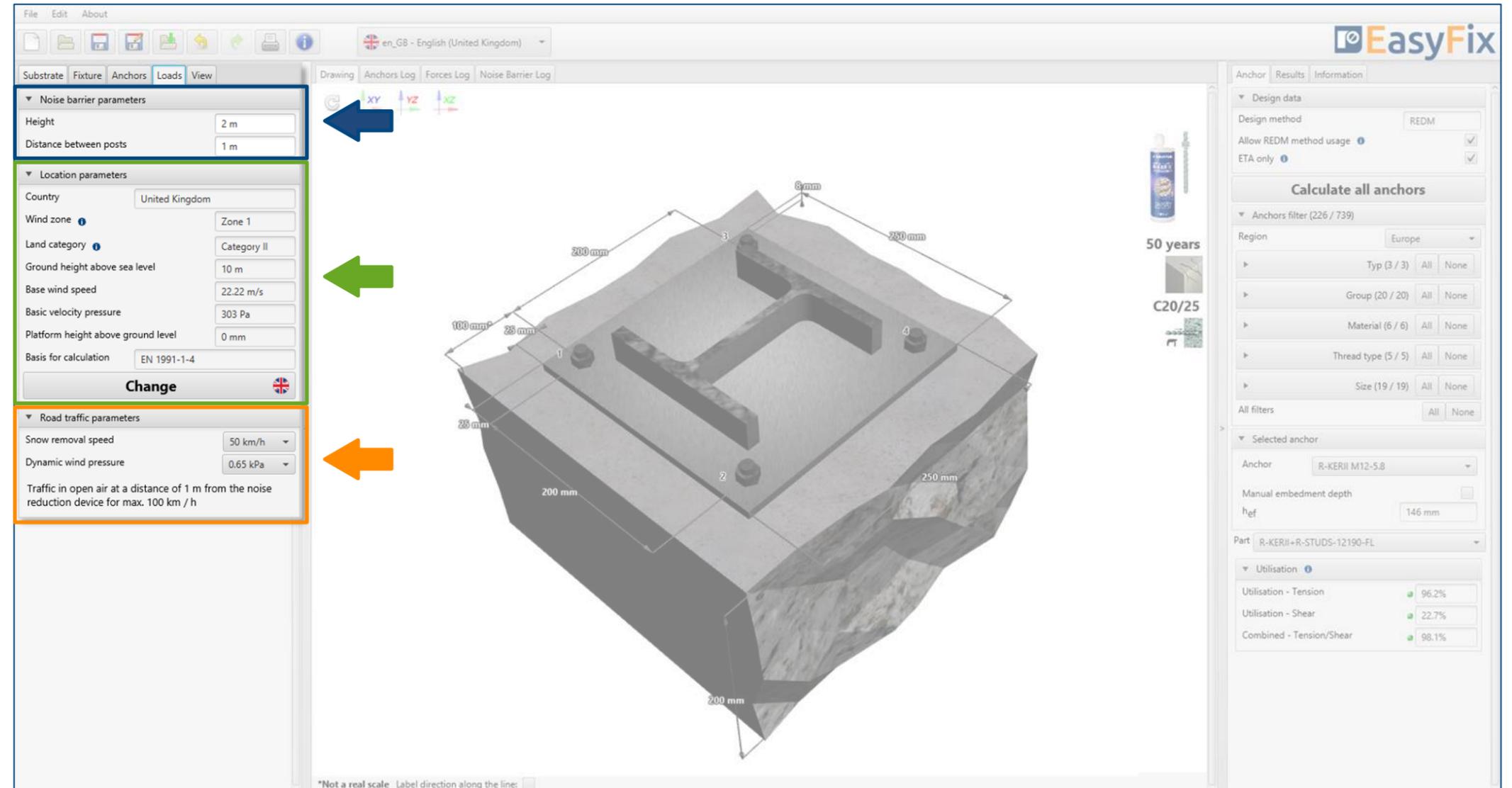
Determination of noise barrier parameters:

- Height of post
- Distance between posts

Defining the location parameters.
Thanks to which the determined forces acting on the anchors are determined.

Determination of road traffic parameters:

- *The speed of snow removal (plowing) is determined in accordance with the EN 1794-1 standard*
- *Dynamic air pressure caused by moving vehicles. The value is selected depending on the position of the road to the sound-absorbing screen.*





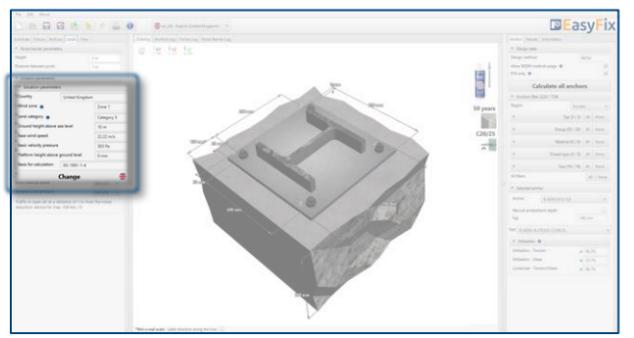
Road & Bridge calculations – Noise barrier

5 Definiowanie Obciążenia



Determining the localization parameters:
The **Change** button to enter the location data of the post to be mounted generates an additional window in which we enter detailed information required to determine the forces acting on the anchors.

The screenshot displays the 'Location parameters' section of the software. It includes fields for Country (United Kingdom), Wind zone (Zone 1), Land category (Category II), Ground height above sea level (10 m), Base wind speed (22.22 m/s), Basic velocity pressure (303 Pa), Platform height above ground level (0 mm), and Basis for calculation (EN 1991-1-4). A 'Change' button with a UK flag icon is highlighted with a blue box and a blue arrow pointing to it from the right. To the right of the parameters is a map of the United Kingdom with various cities labeled, and a vertical column of numbers 1 through 10. Below the main interface, a smaller screenshot shows a 3D model of a noise barrier structure with a 'Change' button overlaid on it.





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6 Analysis of The results



In the results panel, we can choose the appropriate design method, also REDM. Rawlplug Engineering Design Method - is a method that allows the calculation of anchor systems not covered by the EN and ETAG. methods. Unchecking the **ETA Data Only** box allows the use of test data from Rawlplug.

Selection of the **design method** and **service life** of the installed anchor.

Anchor filters allow you to choose the right product based on the region, type and material from which it is made.

Selecting anchor enables a more precise selection of the anchor and the imposition of the depth of its anchorage.

Utilisation Summary results window for the selected anchor

The screenshot displays the EasyFix software interface. On the left, there are panels for 'Noise barrier parameters', 'Location parameters', and 'Road traffic parameters'. The central 'Design data' panel is open, showing a dropdown menu for 'Design method' with options: EN 1992-4, EN 1992-4, ACI 318-11, AS 5216:2018, CTO 36554501-048-2016, ETAG, FIB SAG4 06, and CEN/TS 1992-4-4. Below this, 'Allow REDM method usage' is checked, 'ETA only' is unchecked, and 'Working life of 100 years' is selected. On the right, the 'Results' panel shows 'Design data' with 'Design method' set to EN 1992-4, 'Allow REDM method usage' checked, 'ETA only' checked, and 'Working life of 100 years' selected. Below this is the 'Anchors filter' section with various criteria like Region, Typ, Group, Material, Thread type, and Size. The 'Selected anchor' section shows 'Anchor' as R-KERII M10-5.8 and 'Manual embedment depth' as 94 mm. The 'Utilisation' section shows: Utilisation - Tension at 99%, Utilisation - Shear at 6.3%, and Combined - Tension/Shear at 100%. A 3D model of an anchor is visible in the background.



Road & Bridge calculations – Noise barrier

6 Analysis of The results



Calculate all anchors opens an additional dialog with solution variants. Additionally, the anchor filter is duplicated and the option **show only ok**. Has been added, which allows you to filter only the correct solutions.

The screenshot displays the EasyFix software interface. A central dialog box titled "Calculate all anchors" is open, showing a table of anchor variants with columns for Anchor, Typ, hef, Tension, Shear, Combined, Total, and Apply. The table lists various anchor types such as R-KERII M10-5.8, R-KERII M12-5.8, R-KERII M16-5.8, R-KERII M20-5.8, R-KERII M24-5.8, R-KEXII M10-5.8, R-KEXII M12-5.8, and R-KEXII M16-5.8. The "Apply" column contains checkboxes, with the one for R-KERII M12-5.8 checked. To the right of the table is an "Anchors filter" panel with options for Region (Europe), Typ (2/3), Group (20/20), Material (6/6), and Thread type (5/5). Below the filter is a "Show OK only" checkbox which is checked. The main application window in the background shows design data, a "Calculate all anchors" button, and a "50 years C20/25" label. The right sidebar shows the selected anchor details, including manual embedment depth (146 mm) and utilization percentages: Tension (96.2%), Shear (22.7%), and Combined (98.1%).

Anchor	Typ	hef	Tension	Shear	Combined	Total	Apply
R-KERII M10-5.8	Bonded	98 mm	96.5%	6.3%	96.3%	96.5%	<input type="checkbox"/>
R-KERII M10-5.8 HDG	Bonded	98 mm	96.5%	6.3%	96.3%	96.5%	<input type="checkbox"/>
R-KERII M12-5.8	Bonded	98 mm	97.5%	6.2%	97.7%	97.7%	<input checked="" type="checkbox"/>
R-KERII M12-5.8 HDG	Bonded	98 mm	97.5%	6.2%	97.7%	97.7%	<input type="checkbox"/>
R-KERII M16-5.8	Bonded	101 mm	96.7%	5.9%	96.4%	96.7%	<input type="checkbox"/>
R-KERII M16-5.8 HDG	Bonded	101 mm	96.7%	5.9%	96.4%	96.7%	<input type="checkbox"/>
R-KERII M20-5.8	Bonded	102 mm	97.6%	5.7%	97.7%	97.7%	<input type="checkbox"/>
R-KERII M20-5.8 HDG	Bonded	102 mm	97.6%	5.7%	97.7%	97.7%	<input type="checkbox"/>
R-KERII M24-5.8	Bonded	102 mm	98.7%	5.5%	99.3%	99.3%	<input type="checkbox"/>
R-KERII M24-5.8 HDG	Bonded	102 mm	98.7%	5.5%	99.3%	99.3%	<input type="checkbox"/>
R-KEXII M10-5.8	Bonded	126 mm	97.7%	6.1%	98.1%	98.1%	<input type="checkbox"/>
R-KEXII M10-5.8 HDG	Bonded	126 mm	97.7%	6.1%	98.1%	98.1%	<input type="checkbox"/>
R-KEXII M12-5.8	Bonded	148 mm	98.7%	5.8%	99.4%	99.4%	<input type="checkbox"/>
R-KEXII M12-5.8 HDG	Bonded	148 mm	98.7%	5.8%	99.4%	99.4%	<input type="checkbox"/>
R-KEXII M16-5.8	Bonded	100 mm	96.8%	5.9%	96.7%	96.8%	<input type="checkbox"/>



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6 Analysis of The results

Resulting forces in the anchors gives the values of the tension and shear forces acting on individual anchors.

Tensile loads
the percentage utilisation of the anchor system due to tensile forces in individual failure models

Shear loads
the percentage utilisation of the anchor system from shear forces in individual failure patterns

Combined Tension/Shear
combination of shear and tension actions – percentage utilisation of steel and concrete

The screenshot shows the EasyFix software interface. On the left, there are input parameters for noise barrier design, including height (2 m), distance between posts (1 m), and location parameters (United Kingdom, Zone 1, Category II). The central part of the interface displays a 3D model of a noise barrier base with four anchors (1, 2, 3, 4) and their dimensions. On the right, the 'Results' panel shows the design data and the resulting anchor forces for a 50-year design life.

Resulting anchor forces			
No.	V _x	V _y	N
1	0 kN	-1.875 kN	0 kN
2	0 kN	-1.875 kN	0 kN
3	0 kN	-1.875 kN	26.914 kN
4	0 kN	-1.875 kN	26.914 kN

Tensile load	
β _{N1}	96.2%
β _{N2}	84%
β _{N3}	91.3%
β _{N4}	ND

Shear load	
β _{V1}	11.2%
β _{V2}	ND
β _{V3}	6.5%
β _{V4}	22.7%

Combined - Tension/Shear	
Steel failure	93.7%
Concrete failure	98.1%



Road & Bridge calculations – Noise barrier

6 Analysis of The results



Installation data
Installation parameters of the designed anchor

Dynamic links to:
Technical Library
BIM Library
Rawplug Technical Helpdesk RTH

The screenshot shows the EasyFix software interface. On the left, there are several parameter panels: 'Noise barrier parameters' (Height: 2 m, Distance between posts: 1 m), 'Location parameters' (Country: United Kingdom, Wind zone: Zone 1, Land category: Category II, Ground height above sea level: 10 m, Base wind speed: 22.22 m/s, Basic velocity pressure: 303 Pa, Platform height above ground level: 0 mm, Basis for calculation: EN 1991-1-4), and 'Road traffic parameters' (Snow removal speed: 50 km/h, Dynamic wind pressure: 0.65 kPa). The center features a 3D model of a concrete substrate with an anchor fixture installed. Dimensions are labeled: 100 mm, 200 mm, 250 mm, 200 mm, 250 mm, and 8 mm. On the right, a 'Part' panel shows 'Installation data' for 'R-KERII+R-STUDS-12190-FL'. A blue arrow points from the 3D model to this panel, and a green arrow points from the panel to the 'Technical Library' and 'BIM' logos below. A '50 years' durability label is also visible near the model.

Installation data	
Thread diameter (d)	12 mm
Hole diameter in substrate (d ₀)	14 mm
Min. hole depth in substrate (h ₀)	151 mm
Nominal depth (h _{nom})	146 mm
Calculated min. substrate thickness (h _{min})	200 mm
Installation torque (T _{inst})	40 Nm
Anchor length (L)	190 mm
Fixture thickness (t _{fix})	8 mm
Hole diameter in fixture (d _f)	14 mm
Amount of resin per one mount (normal loss)	14 ml

Technical data: ETA-21/0242 v.11/03/2021

Show photo

TechnicalLibrary
BIM

Technical questions



Road & Bridge calculations – Noise barrier

7

Generating
The printout



In the printout panel it is possible to set regional options, i.e., language, decimal separator and system of units. The printout in pdf format contains all the data that is necessary in design and during the installation of the product.

Print option.
Enables you to generate a document in a pdf format.

The screenshot shows the EasyFix software interface with the 'Print' dialog box open. The dialog box is titled 'Print' and has a 'Print' tab selected. It contains several sections: 'Print language selection' with a dropdown for 'Language' set to 'pL_PL - Polish (Poland)', a 'Decimal separator' dropdown set to 'Language based', and a 'System of measurement' dropdown set to 'Metric'. There is a 'Custom page numbering' checkbox. The 'Project' section includes fields for 'Name', 'Subject', 'Street', 'City', 'Code', and 'Notes'. Below this are sections for 'Organization', 'Calculations made by', and 'Checked by'. The 'Print date' is set to '23.09.2021'. At the bottom of the dialog, there is a 'Print to file' section with a text box containing the path 'C:\Users\azurek\Favorites\6. ARCHIWUM\3. AKTYWNOŚĆ\EF wydruki\easyfix202109231349'. A large blue button at the bottom of the dialog says 'Print the document'. In the background, the main software interface is visible, showing various design parameters and a 'Print' icon in the top toolbar.

