BlachSolid v1.5.0

User manual
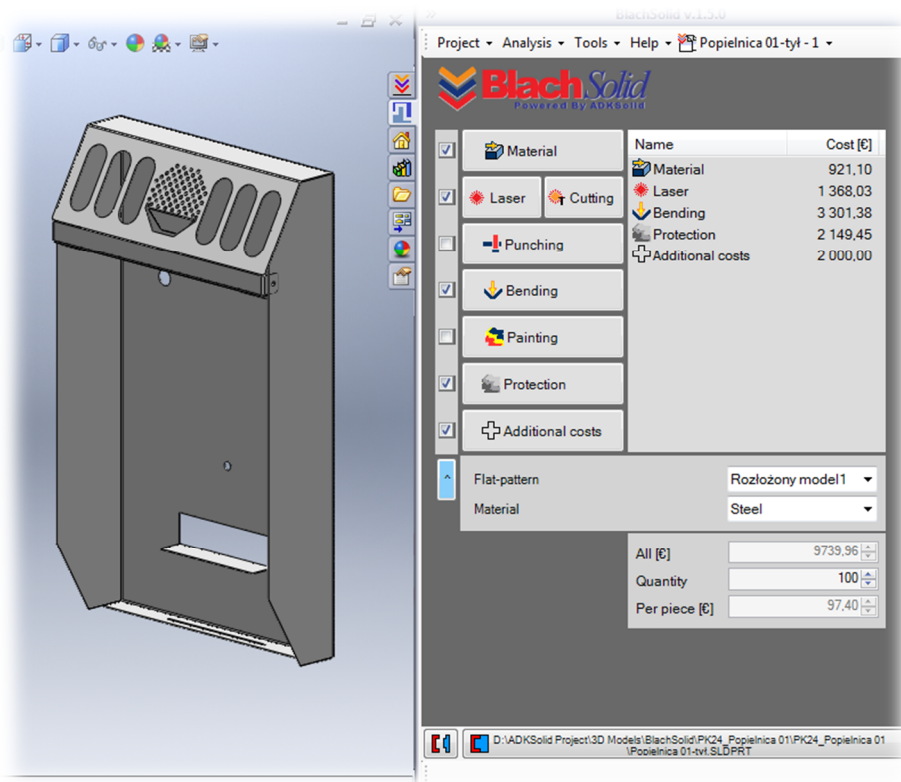
BlachSolid User manual v1.5.0

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1. INTRODUCTION

BlachSolid is a fully integrated SolidWorks® add-in which purpose is to help the User in calculating and controlling manufacturing costs during sheet-metal part design in 3D CAD system. The add-in was designed and programmed together with specialists from the industry who work in SolidWorks® environment, thereby the components valuation in BlachSolid is easy and results are reliable. By working with BlachSolid, that uses information included in the model of the part prepared in "Sheet metal" tool, the designer and/or process engineer can estimate cost of material, manufacturing cost or cost of protection (covering) of the designed part.

SolidWorks® main window with active BlachSolid add-in panel on the right

BlachSolid *has the status of DS SolidWorks Solution Partner – DS SolidWorks® partnership program.*

| ADK Solid
save the time - save the money

| 🏠 HOME
Start | 🔗 MACROS AND ADD-INS
ADKSolid | 💬 HELP
How? | 📱 ADKSOLID
Contact | 🔍

Cost estimation by using **BlachSolid** involves:

- defining type of material, production capacity and choosing cutting operation of the model;
- selecting proper *Calculator*;
- complementing the selected *Calculator* with the information about the cost component and other data that can be taken directly from the 3D model of the part;
- saving the calculation on the *Cost List*.

BlachSolid enables the User to:

- calculate costs in the selected operation mode:
  - manual – in which each component of the cost and its data are set and collected by the User,
  - auto – in which components of the cost and its data are collected automatically from the default settings/values panel and from the 3D model of the part,
  - before starting modeling of a sheet metal part – so called "No model" operation mode,
  - during the design – so called "Real-time" operation mode,
  - after working with the whole design – so called "Final valuation" mode;
- create many cost *Analyses* in one *Project* saved on the PC hard drive;
- add and delete references of the analyzed SolidWorks® model to the *Analysis*;
- set default values for cost *Calculators*,
- adjust parameters of the calculation to conditions prevailing in the enterprise, so that the User gets the real cost result – individual, characteristic to his own enterprise;
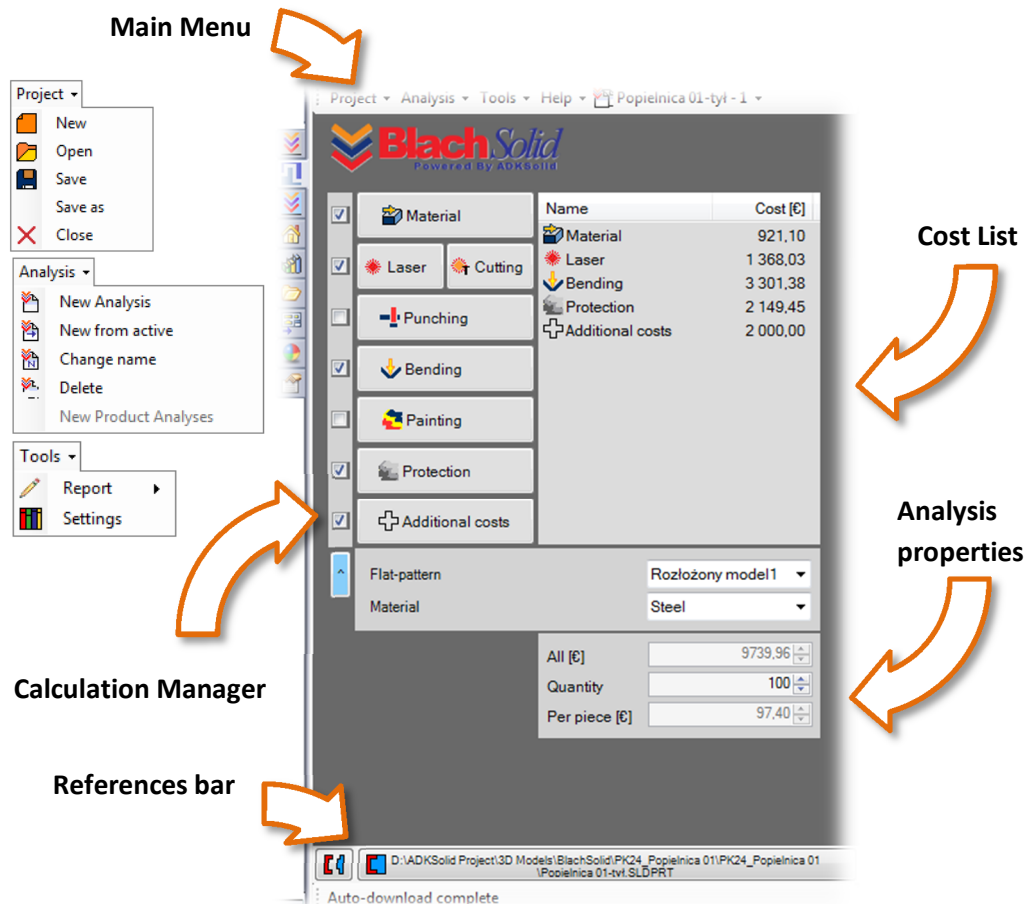- generate summaries in a form of clear and readable reports.

BlachSolid v1.5.0 includes the following Calculators:

- Material
- Cutting
- Punching
- Bending
- Painting
- Protection: zinc plating, electroplating, chromium plating, sand blasting, blackening
- Additional costs.

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2. USER INTERFACE

Main elements of the **BlachSolid** User interface are: **Main menu, Calculation Manager, Cost List, Analysis properties, References bar**.

Other User interface elements are: **Default settings** window, **Calculators**.

2.1. Main menu

Main menu – contains main **BlachSolid** commands regarding *Project*, *Cost analysis*, *Tools* and *Help*. It consists of: **Menu Project, Menu Analysis, Menu Tools** and **Menu Help**.

2.1.1. Menu Project

Menu Project – is used to handle the *Project*

Menu Project *commands*:

New – creating new *Project*

Open – opening *Project* from .bsf file

Save – saving *Project* to .bsf file

Save as – saving *Project* as new, to the .bsf file

Close – closing the *Project*

2.1.2. Menu Analysis

Menu Analysis – is used to handle Cost *Analysis*
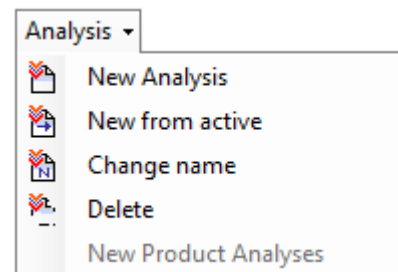

Menu Analysis commands:

New Analysis – creating new *Analysis*

New from active – creating new *Analysis* from the active one – copying active *Analysis*

Change name – changing name of an active *Analysis*

Delete – deleting active *Analysis*

New Product Analyses – creating new *Analyses* to all sheet-metal parts of the product.

2.1.3. Menu Tools

Menu Tools – provides commands to generate *Report* and to open the *Default settings* window

Menu Tools commands:

Report – generating report

Settings – opening the *Default settings* window in which the **BlachSolid** default settings are defined

2.2. Calculation Manager

Calculation Manager is a set of buttons for opening *Calculators* for cost estimation. Clicking the button opens the corresponding **Calculator's Panel**

Button Material 📬 – opens "Material" *Calculator* panel

Button Laser ☀ – opens "Laser" *Calculator* panel

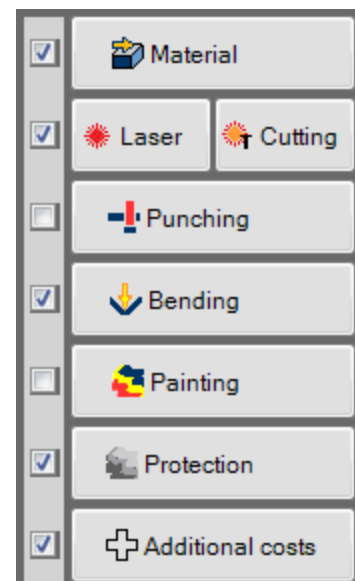*Button Cutting* ☀ – opens "Tech. Cutting" *Calculator* panel

Button Punching ▬! – opens "Punching" *Calculator* panel

Button Bending ⬇ – opens "Bending" *Calculator* panel

Button Painting 🎨 – opens "Painting" *Calculator* panel

Button Protection 🪨 – opens "Protection" *Calculator* panel

Button Additional costs ✚ – opens "Additional costs" *Calculator* panel

2.3. Costs List

Costs List – is a list of cost calculations of a single *Analysis*. In the **Costs List** a unique name, calculation cost and cost type icon are displayed.

The User decides what type of cost components (which calculation) are shown on the *Costs List*. Also calculations with unique names can be added to the *Costs List*, no matter on what type and quantity.

Name	Cost [€]
📦 Material	921,10
✴ Laser	1 368,03
⬇ Bending	3 301,38
🖼 Protection	2 149,45
✚ Additional costs	2 000,00

2.4. Analysis properties

The *Analysis* final result – a sum of cost components of the *Costs list* is displayed in Analysis properties in the text area:

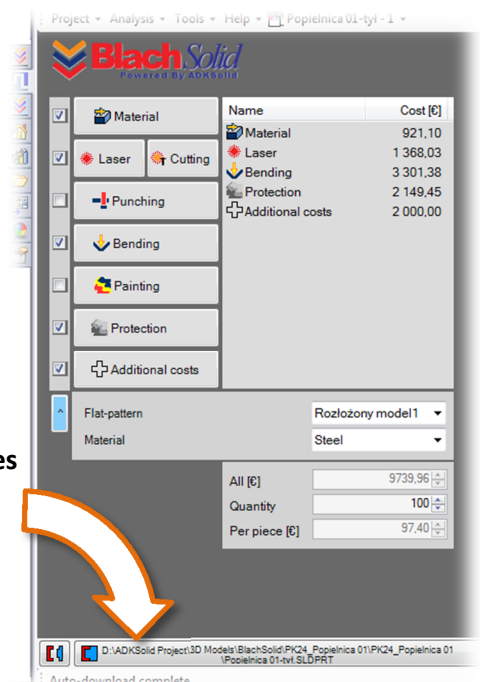*All [€]* – cost for defined production capacity
Per piece [€] – cost calculated to one piece
Quantity – production capacity, number of parts (pieces) needed do produce a given batch of a product

2.5. References bar

References bar – a bar which consists of two buttons that enable setting the *Analysis->Model Reference*, that is assigning an active model for active *Analysis*.
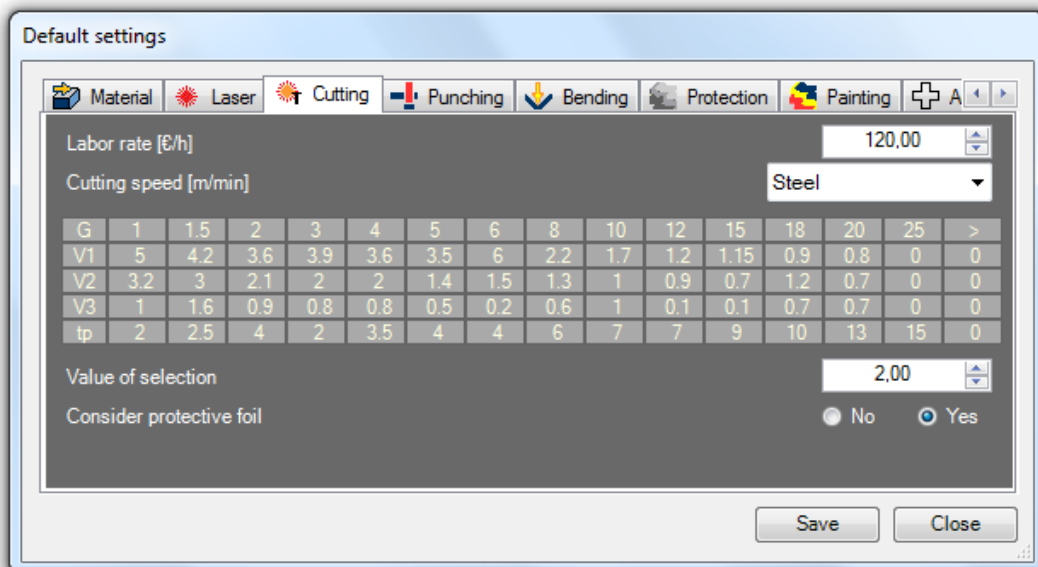
References bar

NOTE! While creating new Analysis the active model is assigned to it by default.

- In case, where the active model is a document referenced as "Part", the *Analysis* will be created with the reference to that model (*Analysis->New Analysis*).

- In case, where the active model is a document referenced as "Assembly", the *Analysis* will be created for all sheet-metal parts (*Analysis->New Product* analysis).

2.6. Default Settings window

Default Settings *window* – a window in which default values are defined for the **BlachSolid** *Calculators*.

Default settings

Material | Laser | Cutting | Punching | Bending | Protection | Painting | A ◄ ►

Labor rate [€/h]   120,00

Cutting speed [m/min]   Steel ▼

G	1	1.5	2	3	4	5	6	8	10	12	15	18	20	25	>
V1	5	4.2	3.6	3.9	3.6	3.5	6	2.2	1.7	1.2	1.15	0.9	0.8	0	0
V2	3.2	3	2.1	2	2	1.4	1.5	1.3	1	0.9	0.7	1.2	0.7	0	0
V3	1	1.6	0.9	0.8	0.8	0.5	0.2	0.6	1	0.1	0.1	0.7	0.7	0	0
tp	2	2.5	4	2	3.5	4	4	6	7	7	9	10	13	15	0

Value of selection   2,00

Consider protective foil   ○ No   ● Yes
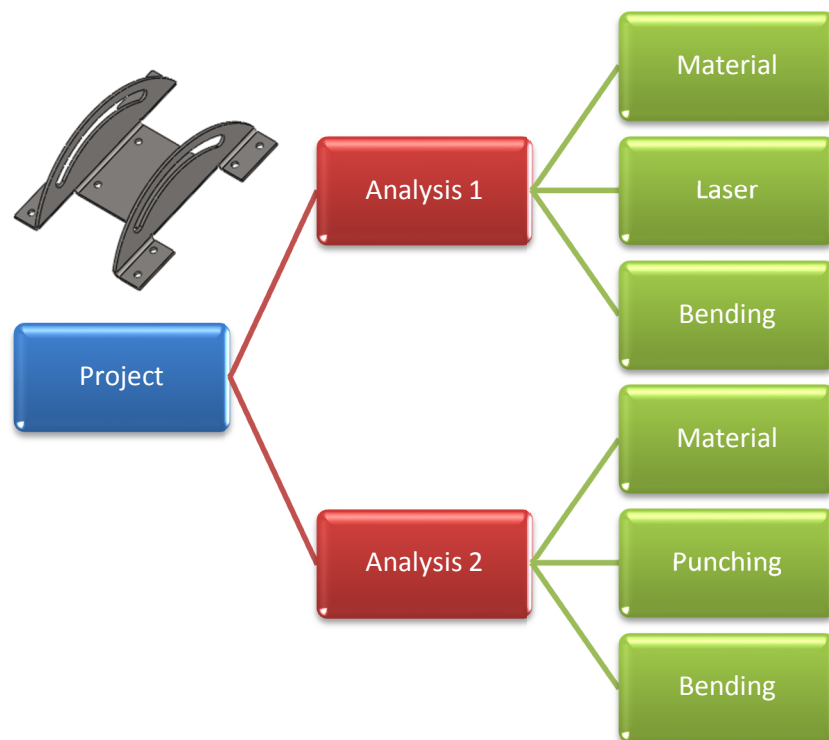
Save   Close

3. CALCULATION PHILOSOPHIE

There are three ways of working with the **BlachSolid** add-in in manufacturing costs analysis:
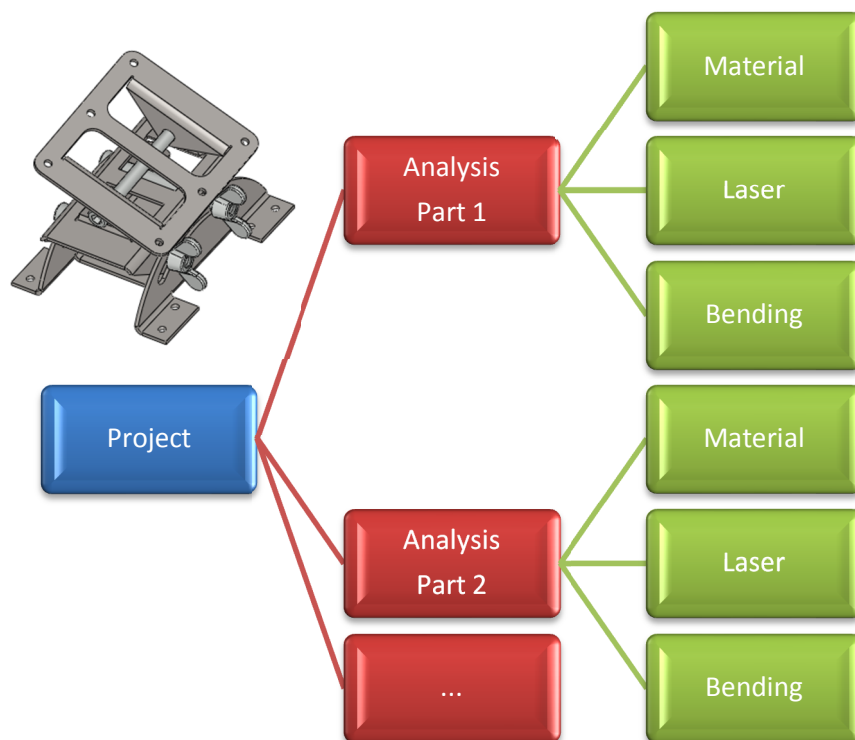
- **Approach no. 1** – cost analysis of the same part

Only one part (model of a part) is being analyzed in the *Project* and all *Analyses* are alternative versions of cost calculations. Cost simulation depending on the chosen material, output sheet, production capacity, properties of a sheet-metal, used machining methods and protection (covering) – gives a full spectrum of the cost.

- **Approach no. 2** – cost analysis of the product

The whole product (assembly model) or chosen sheet-metal parts of the product are being analyzed in the *Project* and the *Analyses* are cost calculations of individual product components.
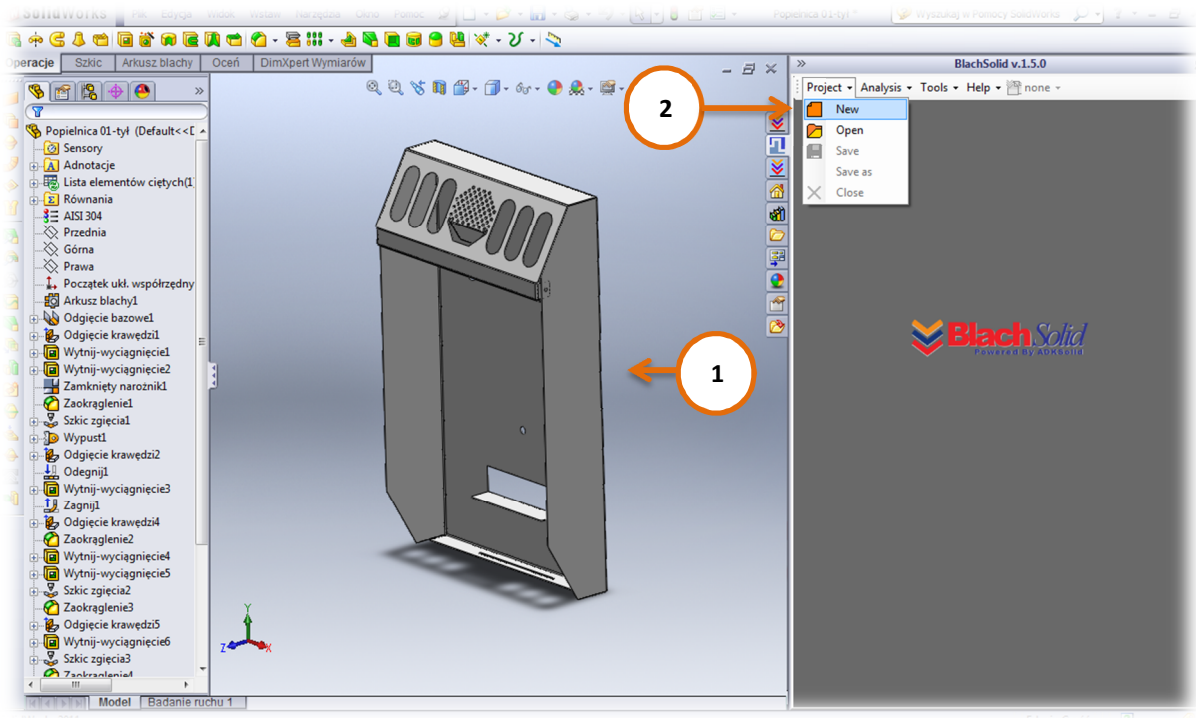

- **Approach no. 3** – mixed cost analysis, as a combination of **Approach no. 1** and **Approach no. 2**

4. BLACHSOLID BASICS

Cost estimation with **BlachSolid** comes down to creation of the *Project* containing any amount of *Analyses* with a reference to chosen 3D models and later on to fill in the *Costs list*.

To create a *Project*:

- open the sheet-metal part model, which is going to be analyzed in terms of cost (**1**),
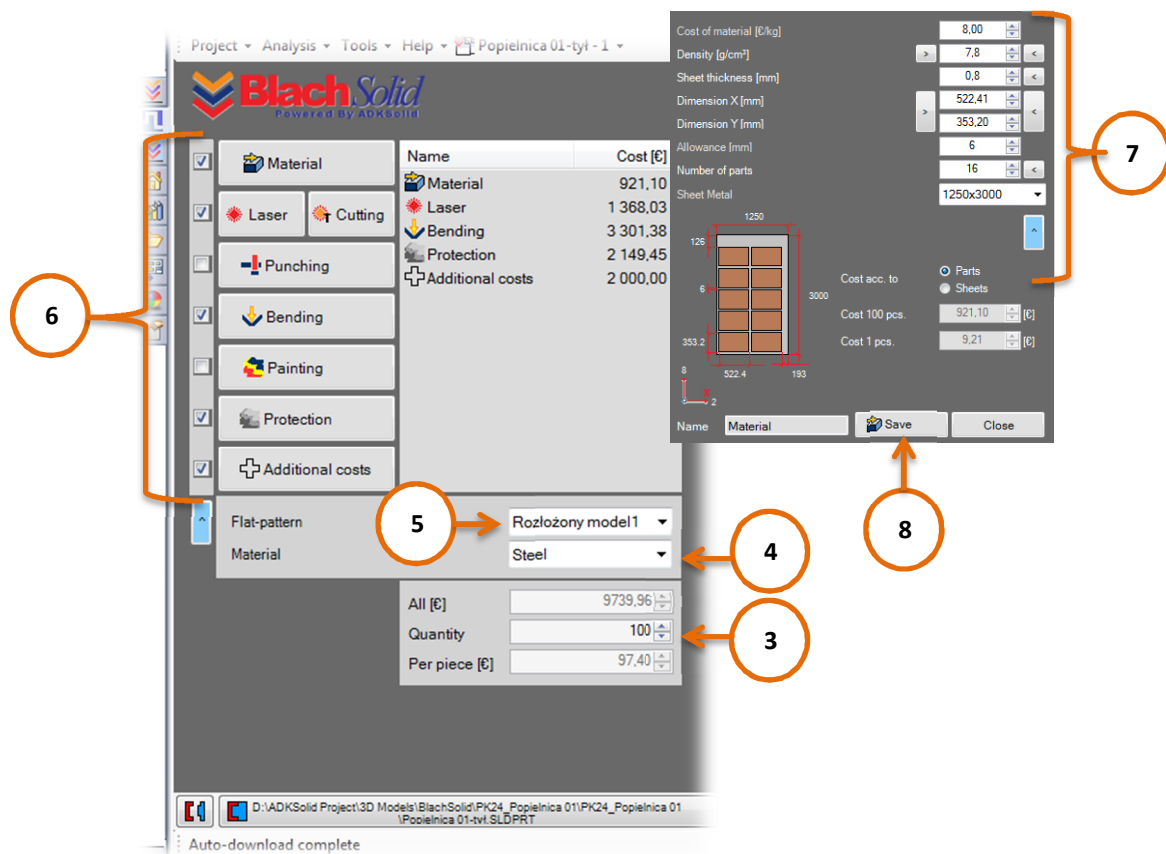- choose *New* from *Project Menu* (*Project->New*) (**2**).

Simultaneously during creation of the *Project*:

- the first *Analysis* is created, which is the same as the name of the active SolidWorks® model of a part,
- the reference of the active model of the part is defined automatically to previously created *Analysis*.

New *Analyses* can be added to the *Project* as well as the existing *Analyses* can be deleted and/or modified.
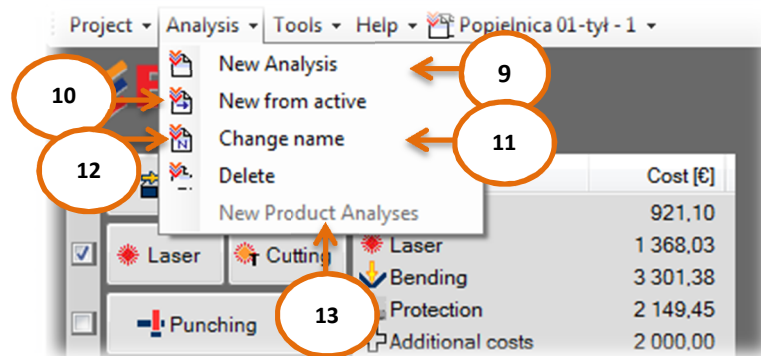
For each *Analysis* in the *Project* it is obligatory to:

- define the production capacity (**3**),
- define the type of material (**4**),
- select the model flat-pattern operation from which information is going to be taken (**5**),
- select the proper *Calculator* (**6**),
- supplement the selected *Calculator* with the information about the cost components and other data, that is taken directly from the 3D model of the part (**7**),
- save the calculation in the *Costs List* (**8**).

4.1. Analyses – add new; delete; change name

Adding new *Analysis* to the *Project*

- In order to add a new *Analysis* to the *Project* select *New Analysis* from **Main Menu** (*Analyses->New Analysis*) (**9**).

- To copy the active *Analysis* select *New from active* from **Main Menu** (*Analyses->New from active*) (**10**).

- To change the name of the active *Analysis* select *Change name* command from **Main Menu** (*Analyses->Change name*) (**11**).

- To delete the active *Analysis* select *Delete* command from **Main Menu** (*Analyses->Delete*) (**12**).

- To add *Analyses* to all sheet-metal parts of the product (assembly model) select *New Product Analyses* (*Analyses->New Product Analyses*) (**13**).
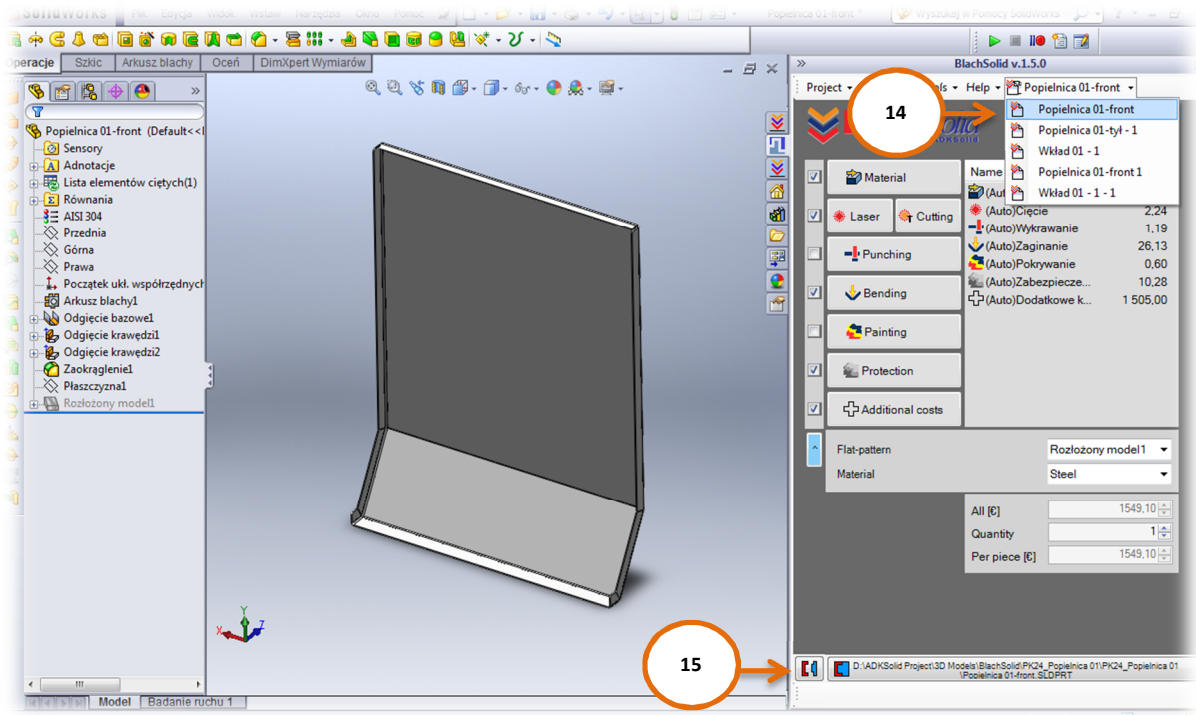
4.2. Reference – assigning model to Analysis

Assigning a model to *Analysis*

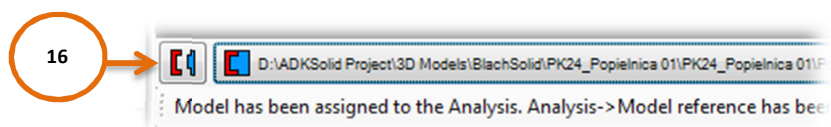In order to assign a model to *Analysis* one should:

- open *the Analysis* (**14**),
- open or activate the proper 3D model of a part,
- click ⬛ button (**15**).

Deleting references

To delete the model reference from *the Analysis*:

- open *the Analysis* (**14**),
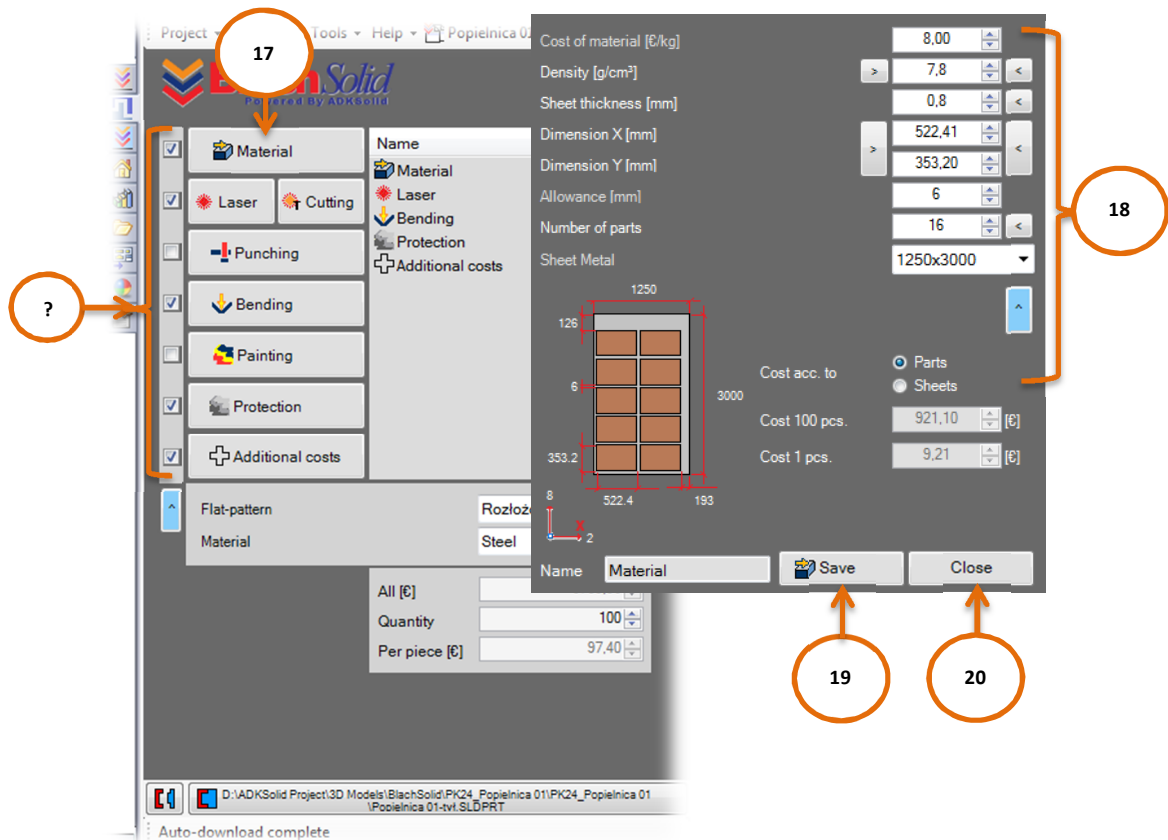- click ⬛ button (**16**).

NOTE! While creating new Analysis the active model is assigned to it by default.

4.3. Calculations – add new; delete and/ or modify existing Calculations

Adding new calculation

In order to add calculation to *the Costs list*:

- select the proper *Calculator* and click the button (**17**),
- fill in the selected *Calculator* (**18**),
- define name for the calculation (**19**),
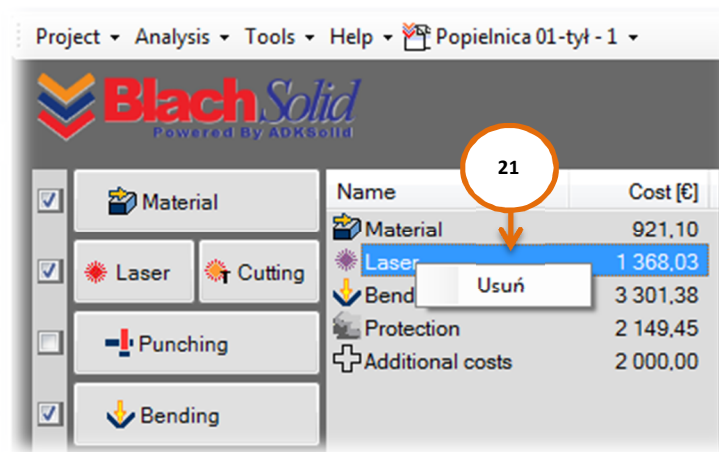- click the *Save* button (**20**).

The calculation will be saved in *the Costs list* under the defined name.

Deleting a calculation

To delete calculation from *the Costs list*:

- highlight a calculation by clicking on a proper row in *the Costs list*
- right mouse button click and select *Delete* from the context menu (**21**)

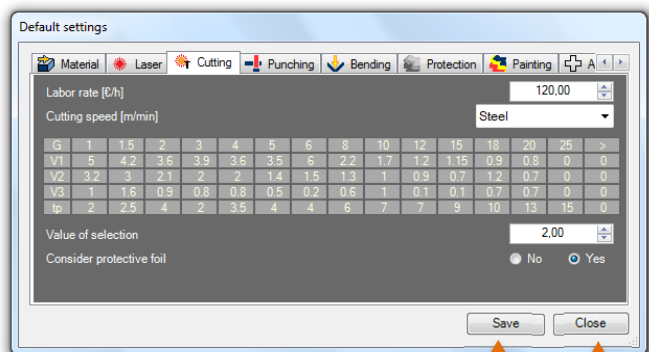## Modifying an existing calculation

To modify a calculation:

- double-click on a proper row of *the Costs list*
- change the *Calculator* settings – make modifications within the selected range
- click *Save* button

NOTE: Costs list components are count during the change of the material type by using "Material" combo box and during changes in the production capacity (changes in "Number of pieces" control).

4.4. BlachSolid default values – definition/ modification

In order to define/ modify the default values in **BlachSolid** one should:

- open **Default values window** by selecting *Settings* command from *Main Menu* (*Tools->Settings*)

- define/ modify the controls/ tabs values – remember, that each tab is assigned to particular *Calculator*

- if you want to save changes in the default values click *Save* button (**22**)

- if you do not want to save changes in the default values click *Close* button (**23**)

5. CALCULATORS

Each of the available **BlachSolid** calculators include the following *Buttons*: *Get data from model*, *Calculation results*, *Close* button, *Save* button and a control to enter the unique *Calculation name*.

To obtain a reliable result of the calculation, enter necessary and valid data – properties, that directly affect the size of the cost. At the first run of calculators (definition of components of the cost in *Costs List*) some of the controls are filled with the default values of the program, defined by the User in the *Default settings window*. The remaining of values can be added manually or got from the model by clicking on *Get data from model* buttons. These buttons are active only when model is assigned to *Analysis*, that means when there is the *Analysis -> Model* reference.

At each stage of work with BlachSolid add-in the User can change values of the calculator's controls which will result in calculation of the cost component.

The calculation can be saved in the *Costs List* under a unique name defined in *Calculation name* control by clicking *Save* button. If the User clicks *Close*, the calculator is closed and the calculation is not saved on the *Costs List*.

The cost for the defined production volume of the detail and cost per one piece are displayed in the *Calculation results* area. Additionally, the time necessary to execute operations for the production volume for "Tech. cutting", "Punching" and "Bending" calculators is displayed.
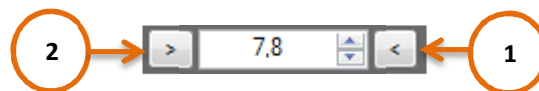
5.1. Material

By using the "Material" calculator the User can:

- calculate cost of material based both on the material cost for a defined production volume, as well as for one piece, according to consumption for a part or consumption of a sheet. If you want to calculate cost of material of a detail, but excluding worksheet metal scrap, use "*Cost acc. to part consumption*" option – pay only for material attributed to the relevant part. If in turn you want to calculate the cost according to the worksheet consumption, click the second option – you pay for the entire sheet.
- calculate on how many parts fit in the selected worksheet,
- calculate on how many parts fit in the X-axis direction and how many in the Y-axis direction of the selected worksheet,
- calculate on how many worksheets will be used,
- calculate dimensions of the scrap stripes,
- have a look at the results graphic view.

In order to calculate the cost of material, fill in the following calculator's controls with data:

Cost of material [€/kg] – cost of material per one kilogram.

Density [g/cm^3] – material density defined for the analyzed part. If you want to get the density of the defined material for the analyzed model – click button on the right side of the control (see figure below - 1). Clicking the button on the left side of the control (see figure below - 2) will result in loading material density for the set material type saved in the **BlachSolid** default values.
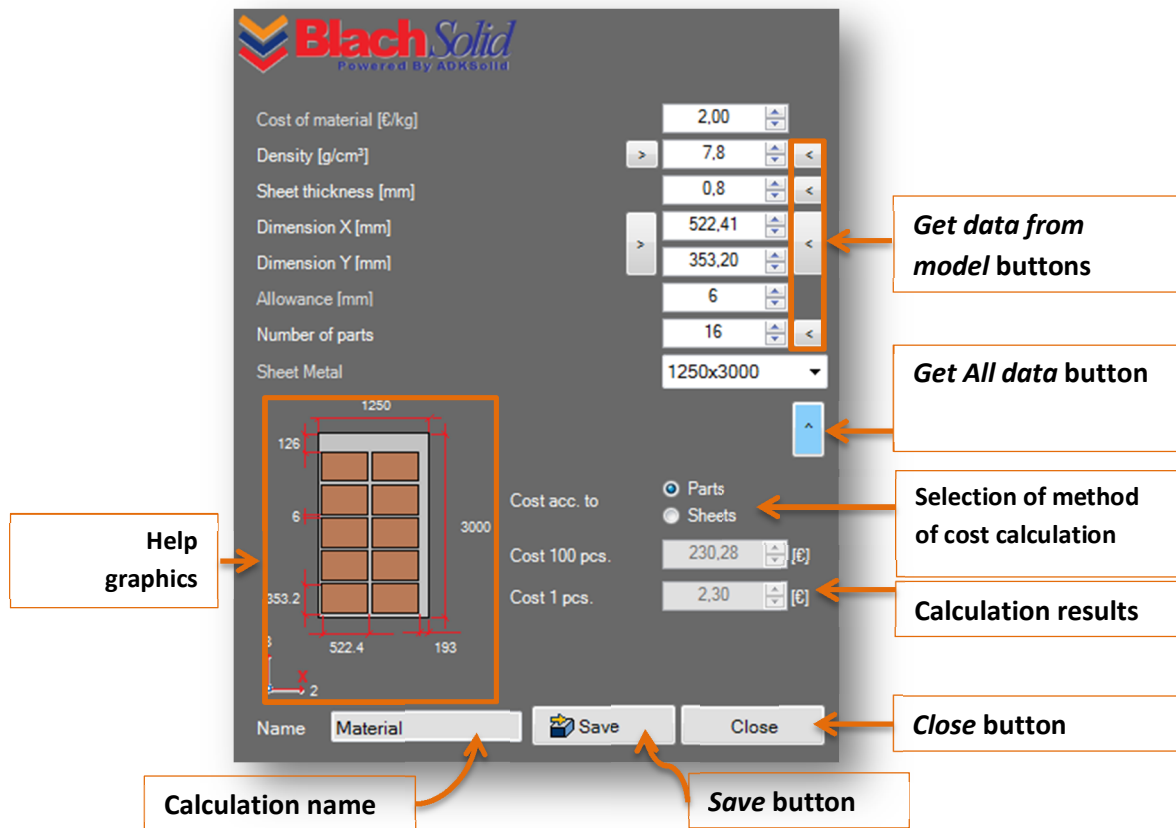

Sheet thickness [mm] – sheet-metal thickness. The User can define thickness by entering the appropriate value in the control. If you want to get thickness from the model, click the button on the right side of the control.

Dimension X [mm] and **Dimension Y [mm]** – dimensions of a rectangle circumscribed on the part. If you want to get dimensions from model, click the button on the right side of the controls (see figure below - 1). The length of the shorter edge of the rectangle circumscribed on the flat pattern of the model of the part will be assigned to the *Dimension X [mm]* control. The length of the longer edge will be assigned to the *Dimension Y [mm]* control.

By clicking the button on the left side of the controls (see figure below - 2) the program will change orientation of the part placed on the worksheet.

Get data from model buttons

Get All data button

Selection of method of cost calculation

Calculation results

Help graphics

Close button

Calculation name

Save button

Allowance [mm] – the allowance value – a safe distance between parts spread on the worksheet.
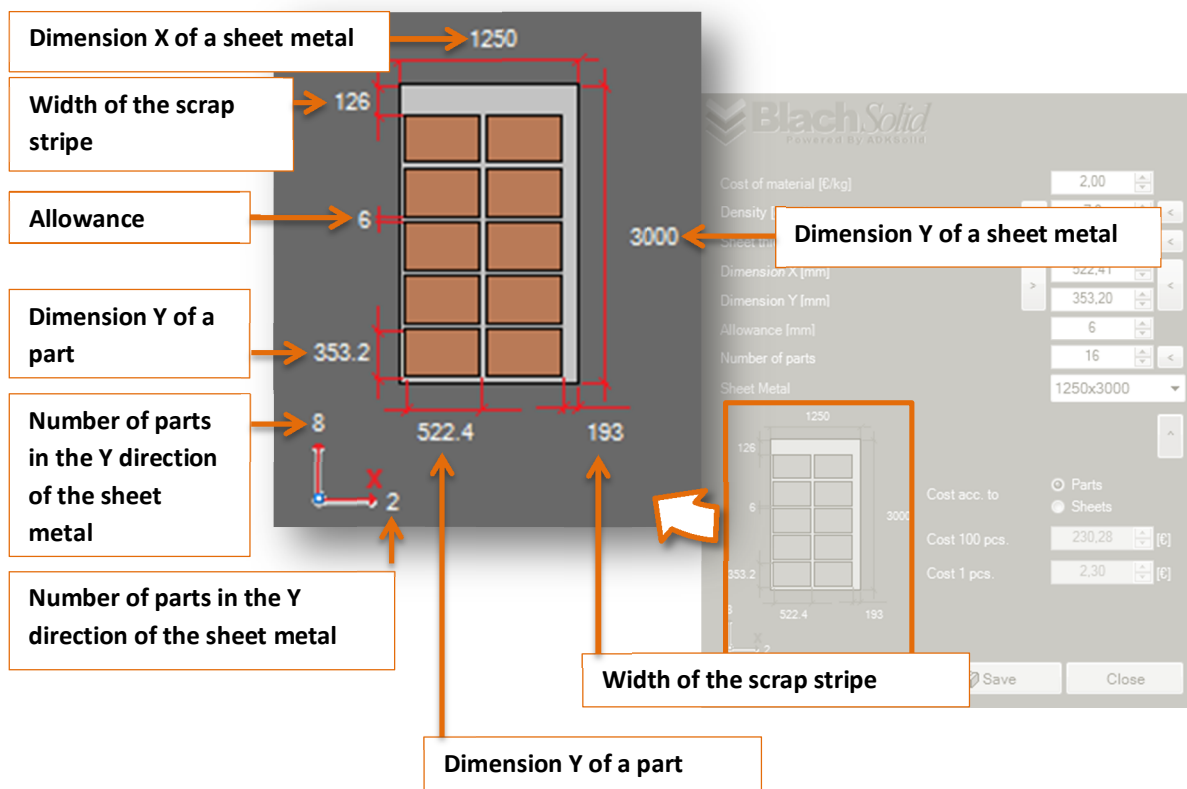
Number of parts – number of parts on the selected worksheet. The number of parts is calculated automatically during part dimensions values, allowance and the worksheet type change.

Sheet metal – type of sheet metal. The User can choose from standard sheet metal sizes: 1000x2000, 1000x3000, 1000x4000, 1250x2500, 1250x3000, 1250x4000, 1500x3000, 1500x4000, 1500x6000, 2000x4000, 2000x6000.

During the first run of the calculator controls: *Material Cost*, *Density* and *Allowance* are filled with the default values of the program – defined by the User in the *Default settings window*. The remaining values should be complemented manually and/or automatically by clicking *Get data* buttons for each control separately or *Get All data* button.
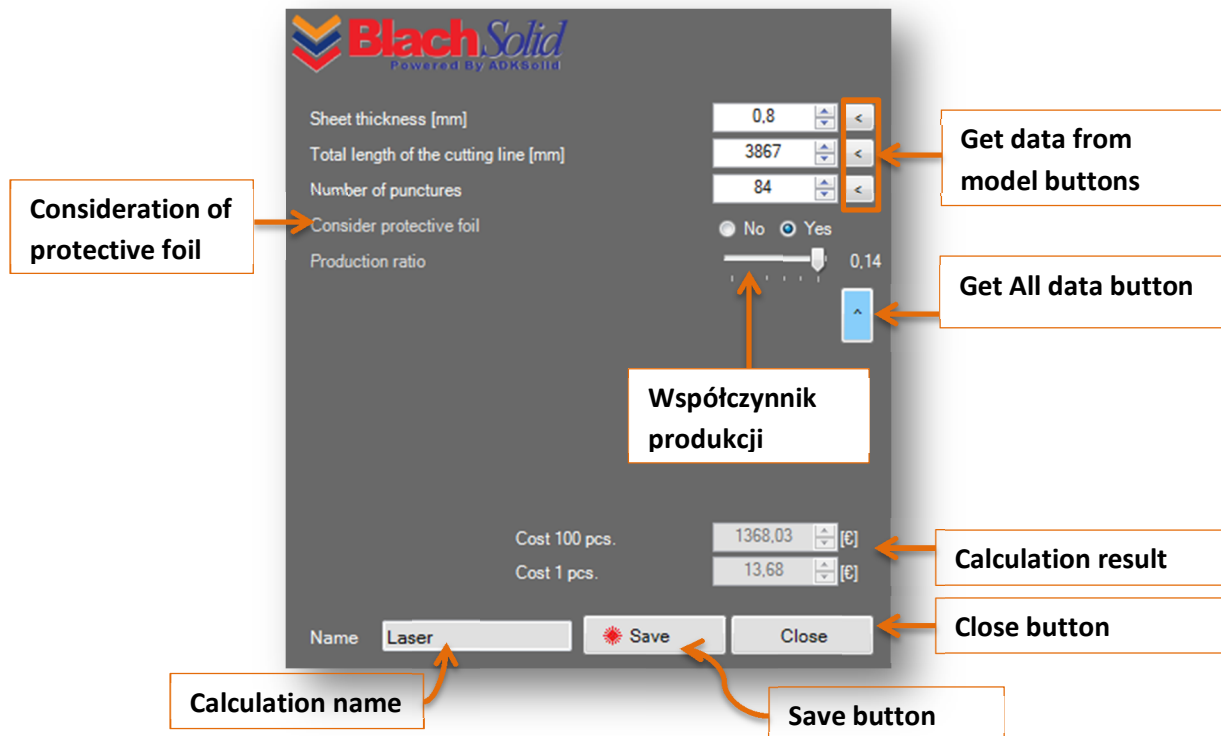
The User can use *Help graphics*, which schematically shows the key information about the part on the selected sheet metal format. The User can quickly decide which settings are best by changing dimensions of the part, orientation of the part on the worksheet, allowance and the sheet metal format.

Note! Width values of the scrap stripes have been rounded to integers.
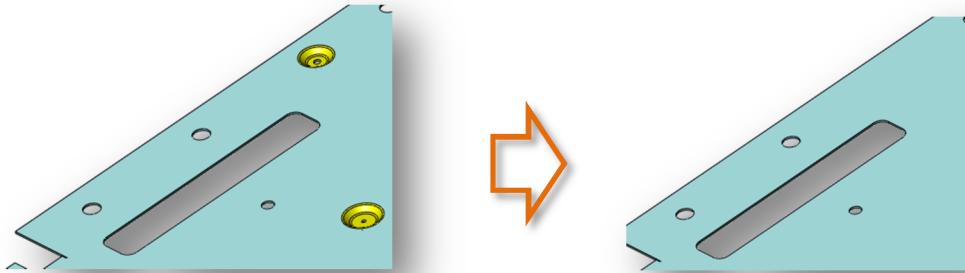
5.2. Laser

The "Laser" calculator has been fully adapted to estimate cost of laser cutting.

In order to calculate cost of laser cutting, fill in the following calculator's controls:

Sheet thickness [mm] – sheet-metal thickness. The User can define thickness by entering the appropriate value in the control. If you want to get thickness from the model, click the button on the right side of the control.

Total length of the cutting line [mm] – overall length of the laser cutting line. The User can define the cutting length by entering the length value in the control or by getting it directly from the model. It has to be remembered, that when the cutting line length is got from the model, the flat pattern (unfold model) shall represent the actual state of the part after the laser cutting process. All features that cause generation of unnecessary lines should be suppressed. If they are not suppressed, the program can download length of the cutting line improperly, which will fake the calculation.

Number of punctures – number of laser punctures in the sheet metal needed to cut the part out.

Consider protective foil – option to select cost calculation of cutting operation with protective foil. If the sheet metal is cut together with protective foil, select "Yes".

Production ratio – coefficient through which it becomes possible to adjust cost to:

- production conditions such as laser power, production volume or complexity of workpiece cuts,
- customer, e.g. level of a granted discount.

Production ratio at 0.15 should be set inter alia: for a new customer, prototype, small order, for cutting with a low-power laser, for cutting with a complicated path, for production which requires machine retooling.

Production ratio at a medium level of 0.13 should be set for a regular customer - large and frequent orders are made.

Production ratio at 0.1 should be set for large orders with simple cuts that do not need retooling and service.

During the first run of the calculator, the *Production ratio* and *Consider protective foil* are set with the default values of the program – defined by the User in the *Default settings window*. The remaining values should be complemented manually and/or automatically by clicking *Get data* buttons for each control separately or *Get All data* button.

5.3. Tech. cutting

"Tech. cutting" calculator was developed in a way, so that it can be used to estimate cost of each sheet metal cutting method, e.g. water jet cutting, laser cutting, plasma cutting. Analytical calculation of the cost by using "Tech. cutting" calculator goes down to determine: *Man-hour rate*, cutting length, straight lines cutting speed, curves cutting speed, small holes cutting speed. Besides, it is important to determine *Number of punctures* and consider possible protective foil.

In order to calculate the cutting cost by using "Tech. cutting" calculator, fill in the following calculator's controls:

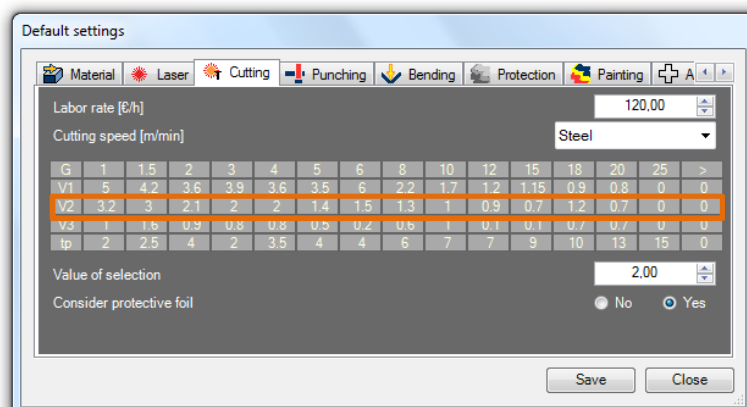**Labor rate [€/h]** – the actual cost of cutting per one hour.

Sheet thickness [mm] – sheet-metal thickness. The User can define thickness by entering the appropriate value in the control or by getting thickness from model. To get the thickness from model, click the button on the right side of the control.

Total length of straight lines [mm] – you can define straight lines cutting length by entering its value in the control or by getting it directly from the model. In order to calculate the straight lines cutting time the velocity V1, defined in the default values of the program, is taken.
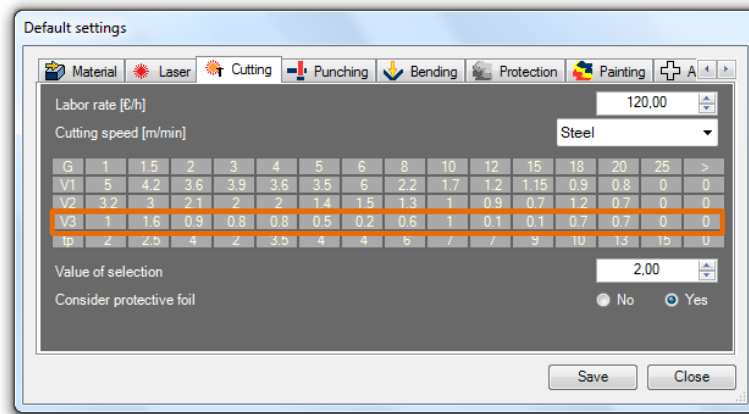

Total length of curves [mm] – you can define curves cutting length by entering its value in the control or by getting it directly from the model. The cutting velocity for curves (V2) is taken automatically from the default settings of the BlachSolid program.
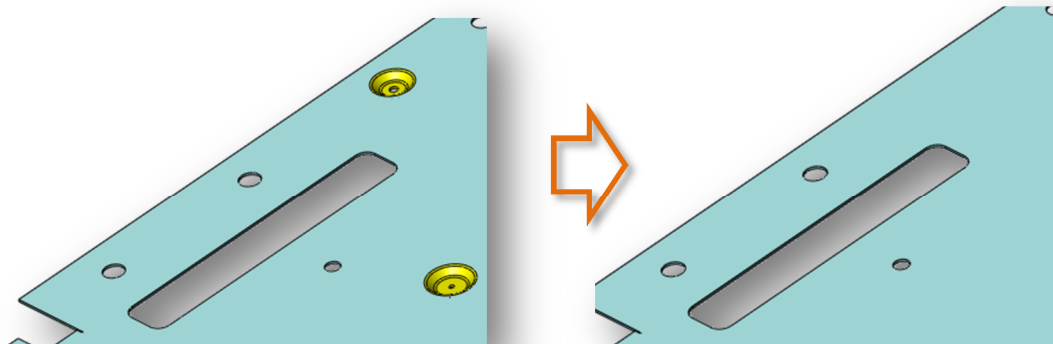

Total length of small holes [mm] – you can define cutting length by entering its value in the control or by getting it directly from the model. Small holes cutting velocity (V3) is taken automatically from the default settings of the BlachSolid program. Note! By clicking *Get data from model* button, the program will get the
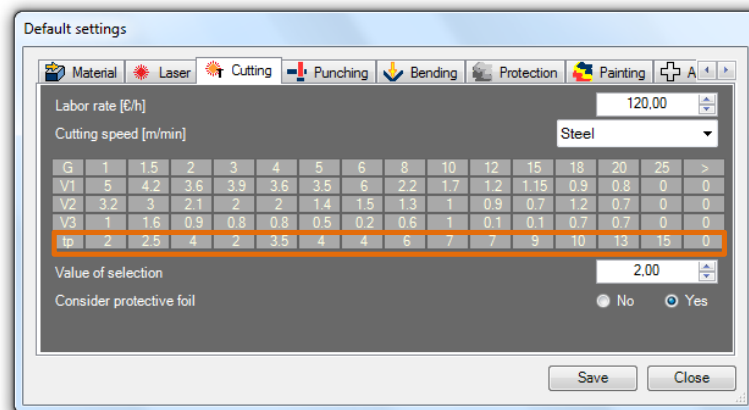
cutting length of small holes, that is holes, that diameter is equal or smaller than the thickness of the sheet metal.

It has to be remembered, that during getting the cutting line length from the model, the flat pattern (unfold model) shall represent the actual state of the part after the cutting operation. All features that cause generation of unnecessary lines should be suppressed. If they are not suppressed, the program can download length of the cutting line incorrectly, which will fake the calculation.

Number of punctures – number of laser punctures in the sheet metal needed to cut the part out. Puncture time (tp) given in seconds is taken directly from the default settings of the BlachSolid program.
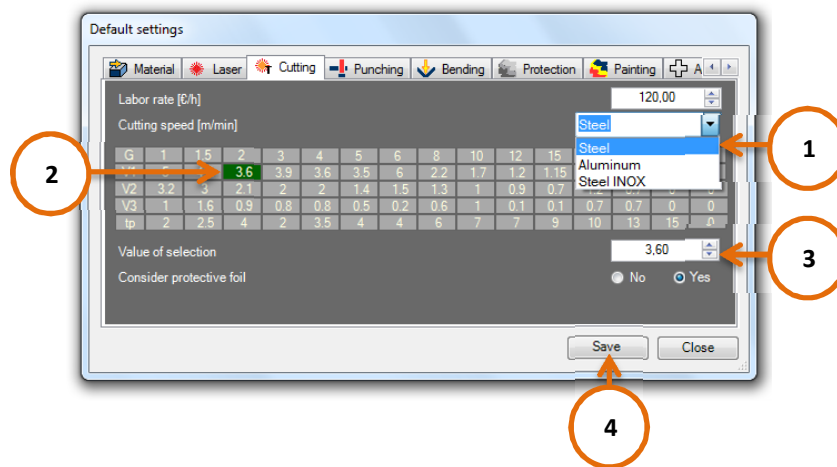
Consider protective foil – option to select cost calculation of cutting operation with protective foil. If the sheet metal is cut together with protective foil select "Yes".

During the first run of the calculator, *Man-hour rate* and *Consider protective foil* are set with the default values of the program – defined by the User in the *Default settings window*. The remaining values should be complemented manually and/or automatically by clicking *Get data* buttons for each control separately or *Get All data* button.
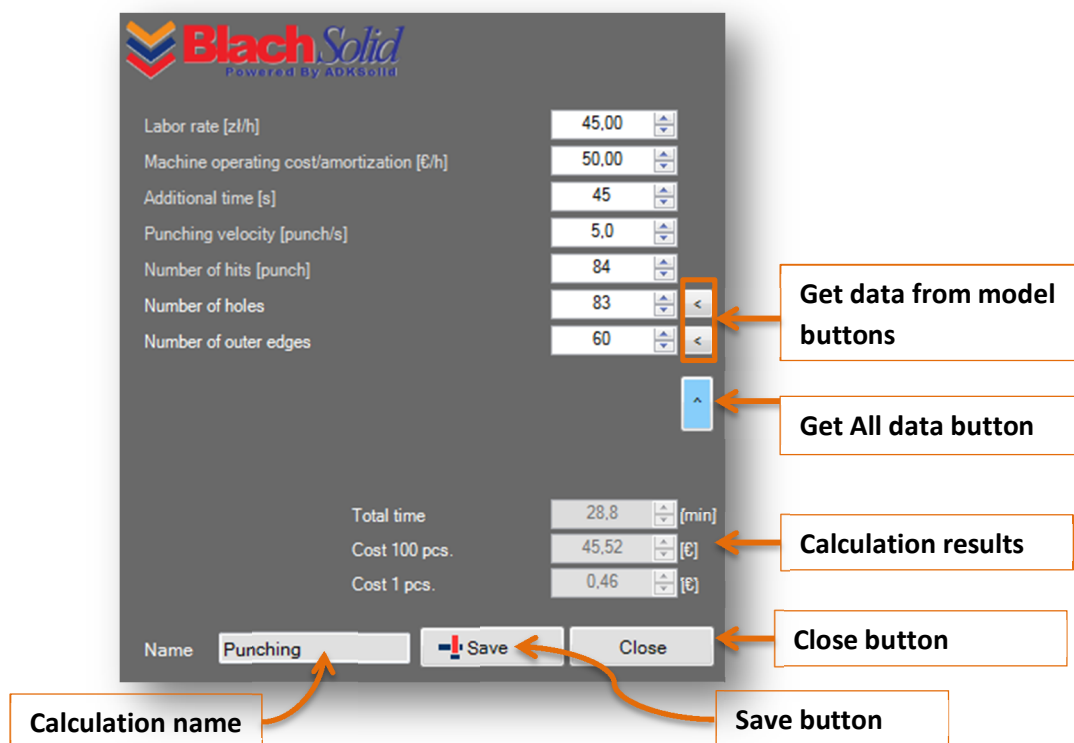
If you want to change the value of line cutting velocity or the puncture time for the appropriate sheet metal thickness:

1. Select material for which you want to change the velocity value or puncture time.
2. Highlight the corresponding label such as straight line cutting speed, that is V1 for the worksheet thickness of 2 mm.
3. Change the value.
4. Save the default values.

5.4. Punching

The "Punching" calculator is intended for calculation of the cost of punching, that is for sheet metal cutting by using punches on mechanical or hydraulic press. By using "Punching" calculator you can estimate cost of the following operations: cutting, hole punching, parting off, pruning, lancing, trimming, trenching.

In order to calculate the punching cost fill in the following controls:

Labor rate [€/h] – the actual machine operation cost.

Machine operating cost/amortization [€/h] – cost of operating the machine/ cost of amortization.

Additional time [s] – Additional time e.g. needed to mount sheet metal in the machine.

Punching velocity [punch/s] – number of punches of the punch (stamp) per second.

Number of hits [punch] – number of hits needed to achieve the desired shape (effect). *Number of hits* depends on the applied operation and the punch designed for the operation. Thus, *Number of hits* should be set (selected) manually.

Additionally, the calculator contains get data from model functions, that may be useful for correct determination of the *Number of hits*, that is:

Number of holes – number of holes punched in the detail.

Number of outer edges – number of outer edges of the detail.

During the first run of the calculator controls: *Operator's rate*, *Machine operating cost/amortization*, *Punching velocity* and *Sheet metal mounting time* are set with the default values of the program, defined by the User in the *Default settings window*. The remaining values should be complemented manually and/or automatically by clicking *Get data* buttons for each control separately or *Get All data* button.
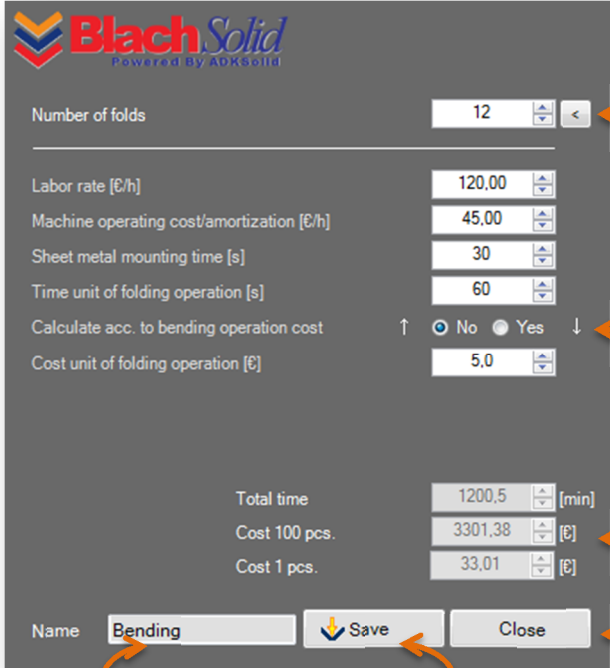
5.5. Bending

The "Bending" calculator was adapted to estimate cost of bending operation, that is: bending, folding, coiling, hemming, profiling, wrenching and planishing.

The calculator enables the User to calculate the cost of bending in two ways:

- according to a unit of time of a single bend. This method involves determining the actual time required for a single bend, and multiplying it by the cost of man-hour. If you want to calculate the cost according to this method set *Calculate acc. to bending operation cost* option to "No".
- according to the cost of one bending operation. This method involves determination of a real cost of a single bend. If you want to calculate the cost according to this method set *Calculate acc. to bending operation cost* option to "Yes".

Bends can be classified according to their complexity. Therefore, in Poland the cost of a "difficult" bend is about 5zł, and the cost of a "simple" bend or serial bends is about 2.5-3 zł.

In order to calculate the bending cost according to folding (bending) time per unit, set *Calculate acc. to bending operation cost* option to "No" and fill in the following controls:

Number of folds – reduced number of folds. You can define the reduced number of folds by entering the appropriate value in the control or by using the button on the right side of the panel. Clicking the button will get the number of folds from the 3D model. Note! The program gets the number of folds that are available in the flat pattern. It is not always true, that the number of folds got from the model is equal to reduced number of folds made during the production process.

Labor rate [$/h] – the actual machine operation cost.

Machine operating cost/amortization [$/h] – cost of operating the machine/ cost of amortization.

Sheet metal mounting time [s] – time needed to mount sheet metal in the machine.

Time unit of folding operation [s] – time in which one fold is made.

In order to calculate the folding cost according to folding (bending) cost per unit, set *Calculate acc. to bending operation cost* option to "Yes" and fill in the following controls:

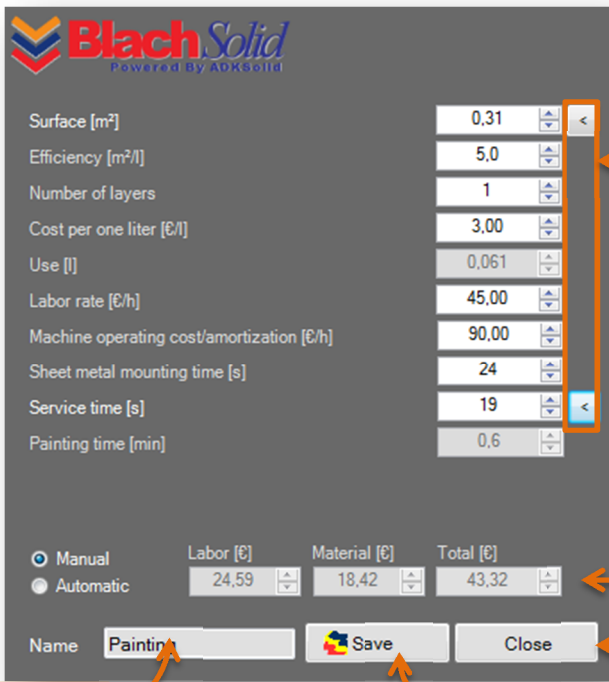**Number of folds** – reduced number of folds.

Cost unit of folding operation [s] – cost of one fold.

If costs or times are different for different types of folds, calculations for as many cost calculations of folds should be carried out as different types of folds have been identified. For example, in particular operation there are three different bends, and each one is valuated in a different way. In such situation three separate calculations made in "Bending" calculator should be added to the *Costs List*.

During the first run of the calculator controls: *Operator's rate*, *Machine operating cost/amortization*, *Sheet metal mounting time*, *Time unit of folding operation* and *Cost unit of folding operation* are set with the default values of the program, defined by the User in the *Default settings window*. The remaining values should be complemented manually and/or automatically by clicking *Get data* buttons for each control separately or *Get All data* button.

5.6. Painting

The „Painting" calculator was developed to calculate painting operation cost, which includes labor cost and the cost of paint consumption. The User can calculate both cost of manual painting as well as cost of automatic painting.

The following controls should be filled in order to calculate the paint consumption and cost of painting:

Surface [m^2] – the surface being painted. You can fill in the control value manually or get the surface from the model. If you want to get the surface from the selected model surfaces, highlight them by clicking CTRL button on your keyboard and click the *Surface* button on the right side of the calculator's control simultaneously. If you want to get the surface of the whole part clear all model selections (highlights) and click the *Surface* button.

Efficiency [m²/l] – efficiency of paint. Set the paint efficiency according to your own experiences or according to information given by the paint manufacturer on the packaging.

Number of layers – number of layers to be painted.

Cost per one liter [€] – cost of one liter of the paint.

Operator's rate [€/h] – the actual machine operation cost.

Machine operating cost/amortization [€/h] – cost of operating the machine/ cost of amortization.

Sheet metal mounting time [s] – time needed to mount sheet metal in the machine.

Service time – additional time needed to perform painting operation.

5.7. Protection

The "Protection" calculator is intended for estimating the following costs in a simplified way: painting, zinc plating, sand blasting, chromium plating, electroplating and blackening.

By selecting or deselecting the *Selection controls* the overall cost of protection is calculated and it is displayed in the *Calculation results* control. In case of different operations the cost calculation comes down to:

- in painting, chromium plating, electroplating and blackening: to define the value of the surface and the rate for "protection" of one square meter of a surface according to the corresponding method,
- zinc plating: to define mass and cost of zinc plating of one kilogram of material.

5.8. Additional costs

The "Additional costs" calculator is intended for costs, which should be added to the overall cost of manufacture and which has not been included before. You can add the following to the *Costs List*:

- cost, which will be valued based on the determined production volume, e.g. costs associated with the development of a program for the machine, project costs, tolls design and manufacture, etc. This cost will be directly added to the *Costs List*.

- cost, that will be priced per one unit – this cost will be multiplied by the defined production volume.

Calculation name

Save button

Close button

5.9. Additional information

If you would like the calculators to calculate cost in a different way, please contact us. We will modify the program specially for you, so that the cost calculation will be adapted to conditions in your company. Under the BlachSolid Corporate Edition license we will make the above mentioned modification for free. Details on www.adksolid.com

6. Additional information about BlachSolid

BlachSolid is developed and improved with each version of the program. The development of the program is affected by our Customers. They can send suggestions for both the operation and functionality of BlachSolid.

Our goal is to develop a tool, which will improve calculation of costs and give the User reliable results of analyses that will fit to reality of given region or business activity, etc.

6.1. Requirements

Program requirements:

- SolidWorks® 2009 or later – the add-in was tested on SolidWorks® 2010,
- Microsoft .NET Framework 3.5 – run time environment for applications based on .NET Framework architecture,
- Microsoft Windows XP/Vista/7,
- Microsoft Office 2003/2007/2010.

Hardware requirements: the same as for SolidWorks®.

6.2. Language

The program is available in two language versions: Polish and English

The User can change the language in the default settings of the program in *BlachSolid Settings* tab.