

# Highway Navigator – Functionality Section

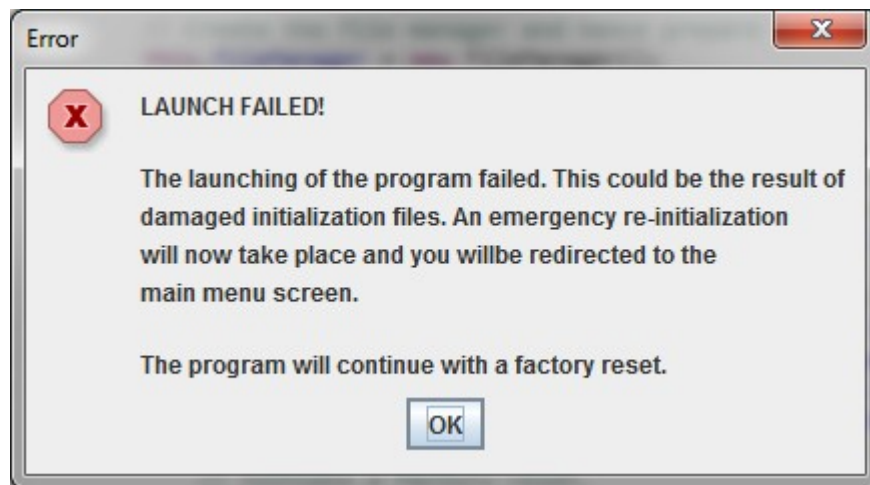
This is the “functionality documentation” section, cut out from the total documentation I provided for the National Highway Company along with the program. I excluded the rest of the documentation, because it was 300 pages of information, including everything up to the source code itself.

This should be enough to give a good overview of how the program works:

---

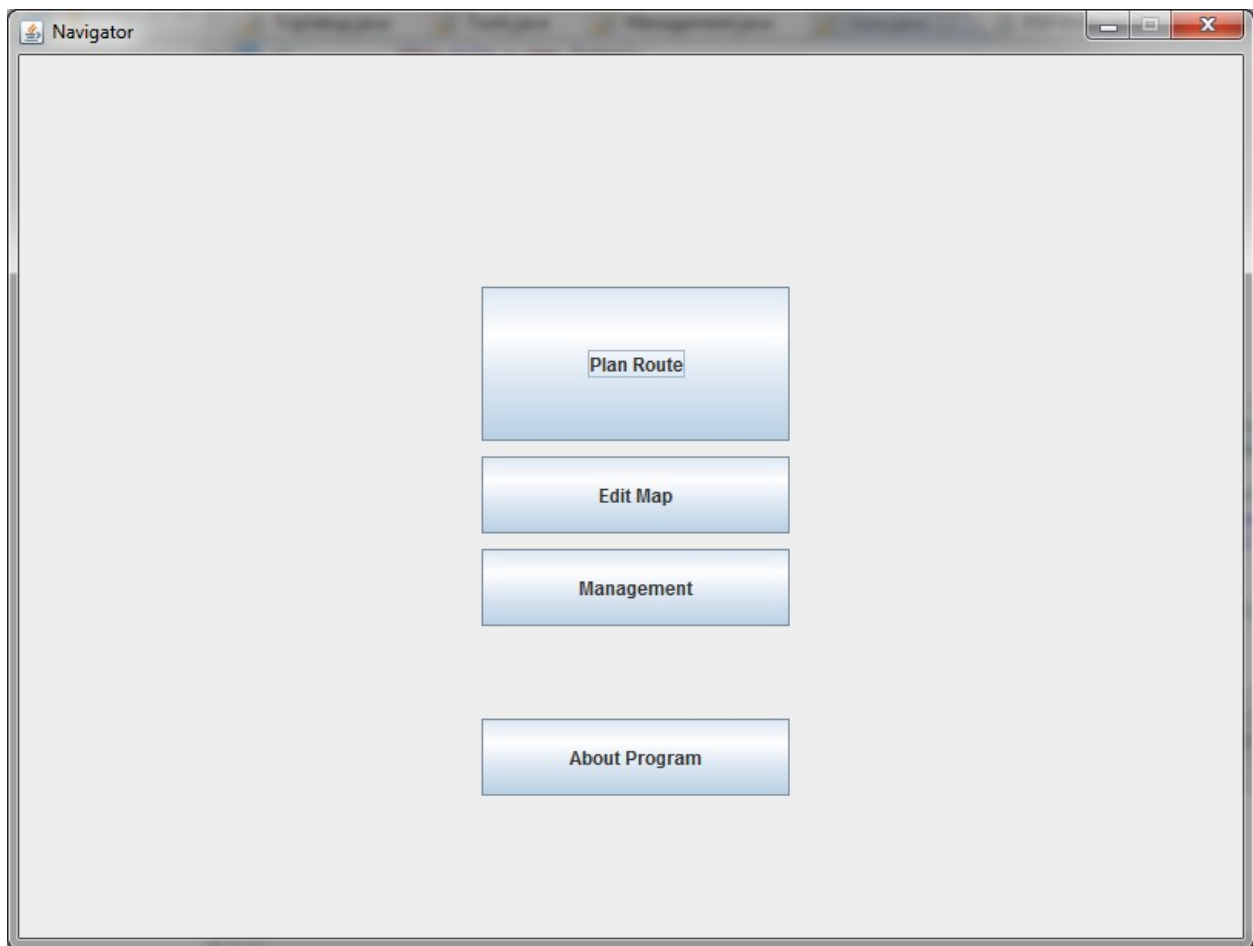
## Starting the program

When the program starts, it loads the currently saved information from files. If this loading fails, the following error message will be displayed:



**Figure - Failed Launch error message**

In such case, the program loads a blank Highway System and goes to the main menu. If the loading is successful, the main menu screen appears as well, but with successfully loaded information in the program:



**Figure - Main Menu screen**

## Planning a Route

When the user presses the “Plan Route” button, the screen switches to the Trip Setup screen, showing input fields the user has to fill out.

## Transport Information

Company Name:

Date of Transport:

## Vehicle Information

Weight Separation:  t Example: 4 + 3 + 2 x 8 + 9

Axle Separation:  m Example: 4 + 3 + 2 x 8 + 9

Total Weight:  t

Total Length:  m

Height:  m

**Figure - Trip Setup screen**

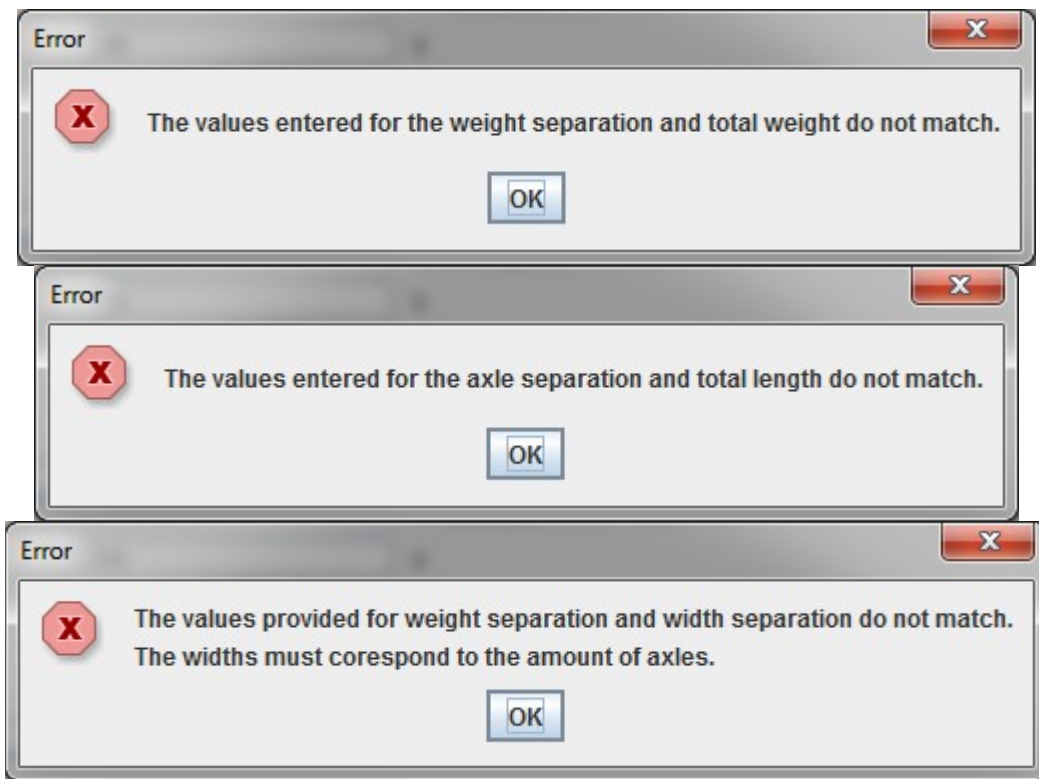
The user can return to the main menu if he wishes, or he can proceed with the setting up of the transport. If the user decides to go back to the main menu, the program will warn the user, that all information provided on this and the following screen will be lost once the user is back at the main menu screen.



**Figure - Going back verification**

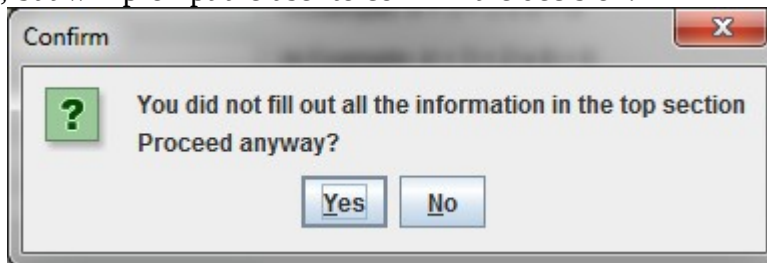
If the user decides to proceed with the setting up of the transport, several error messages can appear, depending on the type of error in the input fields. Any mismatch of values, numeric errors or missing information results in the corresponding error message:





**Figure - Various input errors**

If the user attempts to proceed without specifying the company name or the date of transport, the program will allow it, but will prompt the user to confirm the decision:



**Figure - Continue without some information verification**

An example of a correctly filled out transport screen:

## Transport Information

Company Name:

Date of Transport:

## Vehicle Information

Weight Separation:  t Example: 4 + 3 + 2 x 8 + 9

Axle Separation:  m Example: 4 + 3 + 2 x 8 + 9

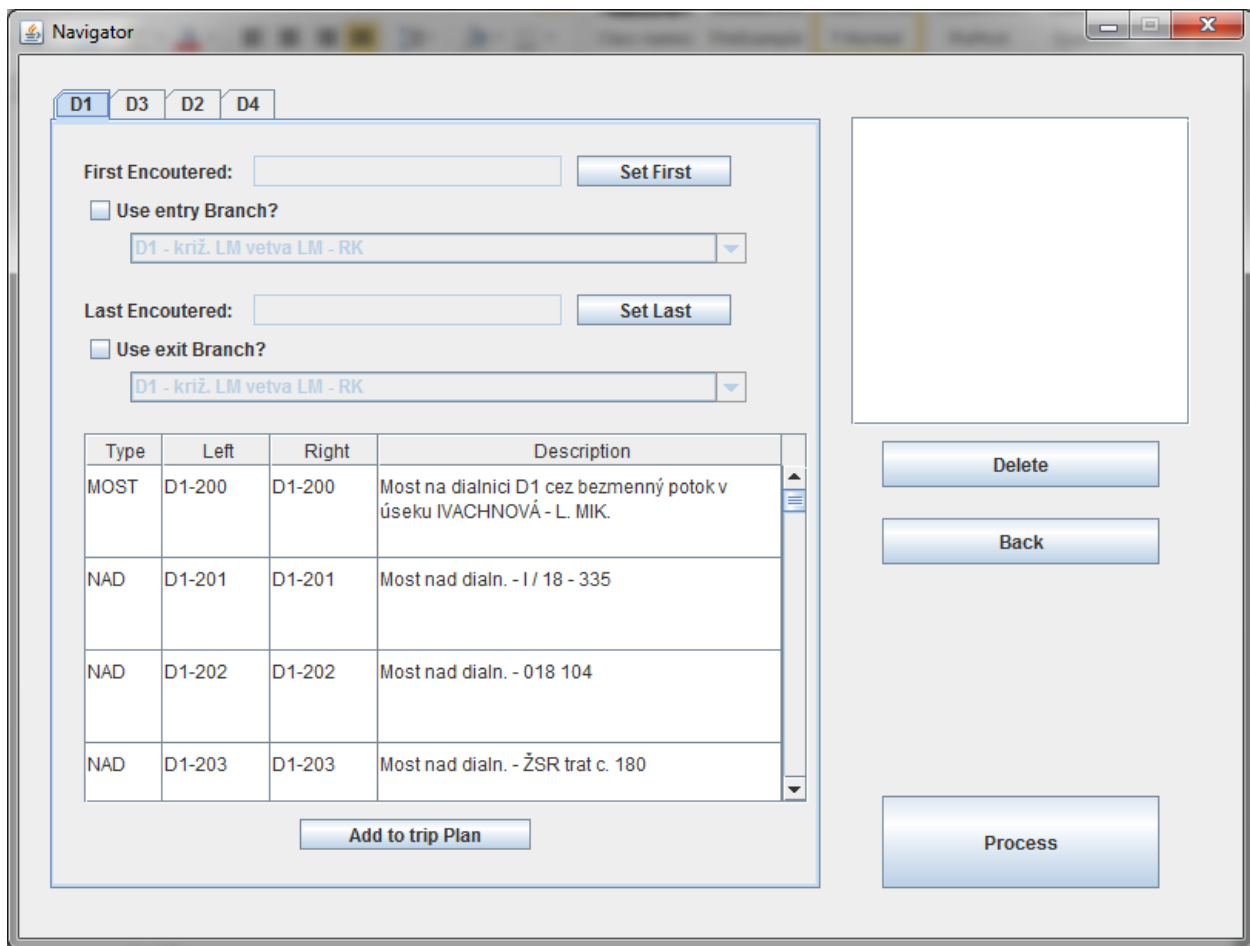
Total Weight:  t

Total Length:  m

Height:  m

**Figure - Sample filled out Trip Setup screen**

Once the user clicks “Next”, he will be redirected to the route selection screen. Here the user can select the starting point, ending point and entry and exit branches that the vehicle will use on the highway.



**Figure - Route Planner screen**

At this screen the user can select a starting obstacle (the first obstacle the vehicle will come across on the highway): The user can select the obstacle from the table and click "Set First", to set it as the first obstacle. The program will then display the IDs of that obstacle in the text field:

D1 D3 D2 D4

First Encouered:

Use entry Branch?

Last Encouered:

Use exit Branch?

Type	Left	Right	Description
MOST	D1-200	D1-200	Most na dialnici D1 cez bezmenný potok v úseku IVACHNOVÁ - L. MIK.
NAD	D1-201	D1-201	Most nad dialn. - I / 18 - 335
NAD	D1-202	D1-202	Most nad dialn. - 018 104

**Figure - Selecting an entry Obstacle**

This same can be done for the last encountered obstacle. As the branches are optional, the user can select whether an entry or exit (or both) branches should be used. Once the branch is selected as used, the dropdown menu becomes active and the user can select a branch.

D1 D3 D2 D4

First Encouered:

Use entry Branch?

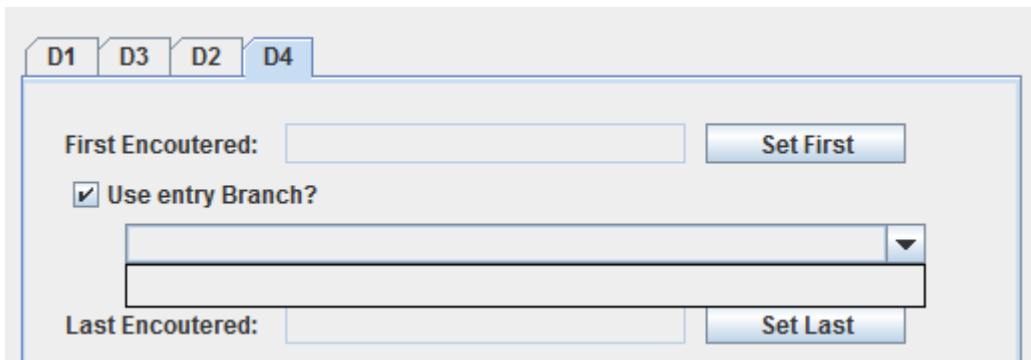
Use exit Branch?

Last

Type	Left	Right	Description
MOST	D1-329	D1-329	Most na dialnici cez melioračnú priekopu

**Figure - Selecting an entry Branch**

If there are no branches on the highway and yet the user decides to activate one,



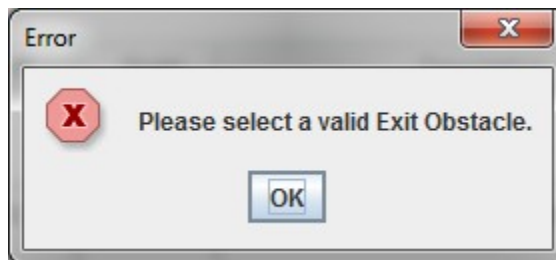
**Figure - Non-existent Branches**

the program will display an error message when the user adds the finished route to the plan:



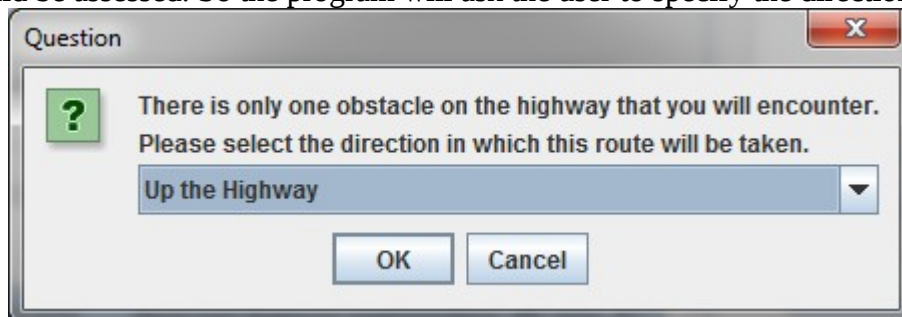
**Figure - Selecting a non-existent Branch error message**

If the user clicks "Add to trip plan" choosing a valid entry and exit obstacle, the program will display the following error:



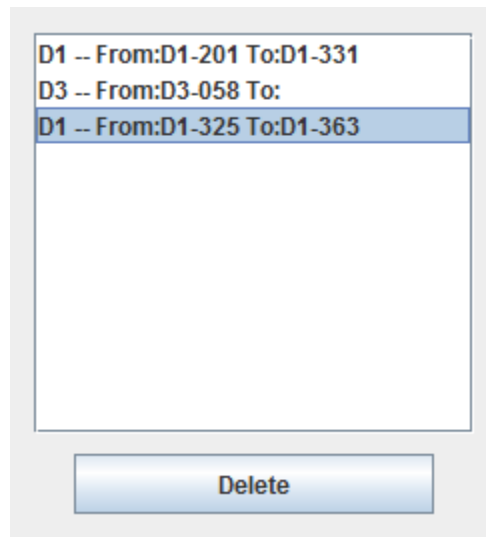
**Figure - Missing exit Obstacle error message**

If the user selected the same obstacle as the first and last (the vehicle will only pass over one obstacle), the program has no way of knowing, which side of the obstacle will the vehicle pass over and hence which side should be assessed. So the program will ask the user to specify the direction:



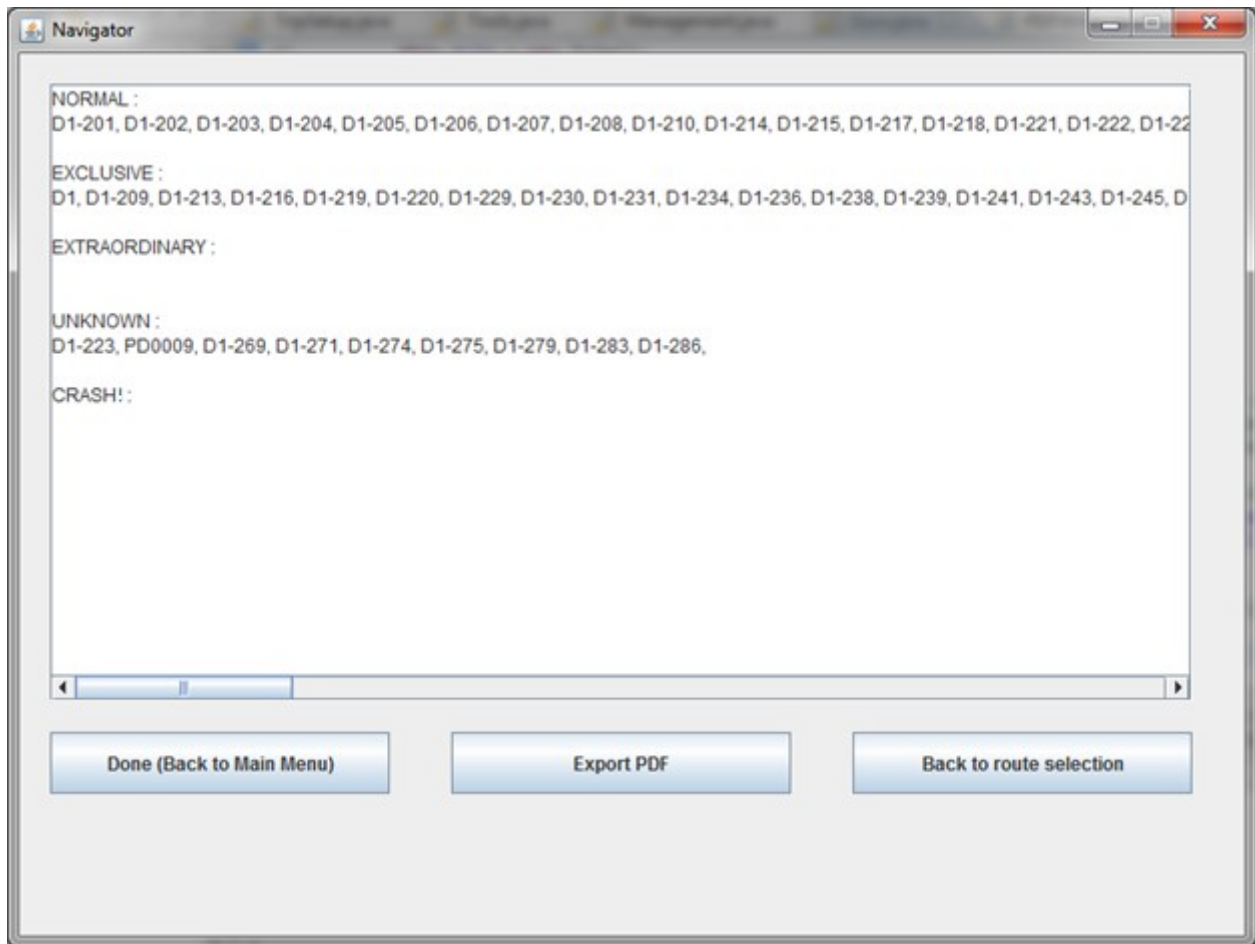
**Figure - Direction specification prompt window**

Once a route is added, it will be displayed in the list of routes. From there the user can then delete it, if he changes his mind.



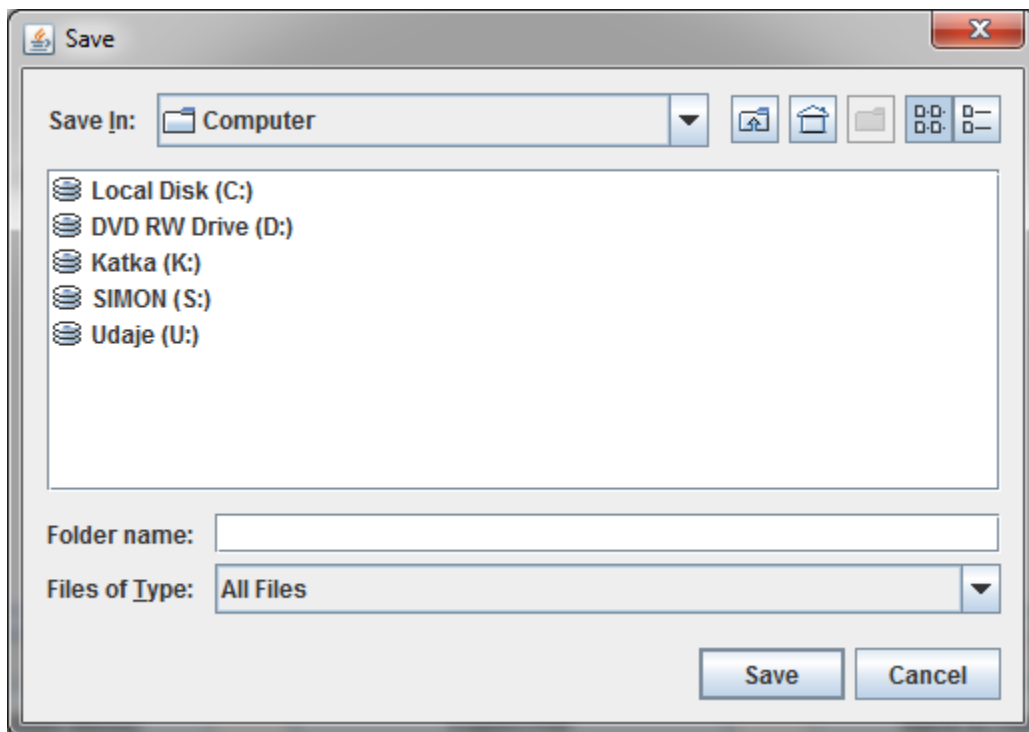
**Figure - Sample list of selected Routes**

From this screen the user can also go back to the screen where the information about the vehicle was specified, without losing any selected routes. If the user presses the “Process button”, the routes will be processed and the output will be displayed on the output screen. This is the output for the above described vehicle and selected routes:



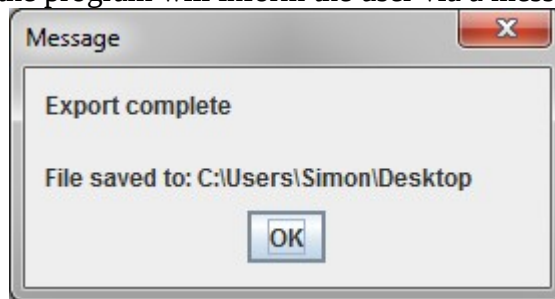
**Figure - Sample Output screen**

From this screen too, the user can go back to the route planning and transport setup, but the routes will be re-assessed whenever the user gets back to this screen. Going back to the main menu displays the same warning about losing information as the transport setup screen. When the user clicks “Export PDF”, the program enables the user to select the output folder (only folder):



**Figure - Saving the PDF file**

Once the export is complete, the program will inform the user via a message window:



**Figure - Export complete message**

And the exported PDF file looks like this:

Evaluation of bridge restrictions - National Highway Company, Department of Bridges

Company Name: IB Finals distributor

Date of transport: 1st May 2013

MOSTY:

Mode	Obstacle
Normal	D1-201, D1-202, D1-203, D1-204, D1-205, D1-206, D1-207, D1-208, D1-210, D1-214, D1-215, D1-217, D1-218, D1-221, D1-222, D1-224, D1-225, D1-228, D1-232, D1-233, D1-235, D1-237, D1-240, D1-242, D1-242.1, D1-244, D1-249, D1-256, D1-257, D1-263, D1-264, D1-270, D1-285, D1-328, D1-330, D1-331, D3-057, Unknown ID, Unknown ID, Unknown ID, Unknown ID, D1-328, D1-330, D1-331, D1-333, Unknown ID, D1-335, D1-336, Unknown ID, D1-348, D1-351, D1-353, D1-354, D1-355, D1-356, D1-357, D1-358, D1-359, D1-360, D1-361, D1-362, D1-363,
Exclusive	D1, D1-209, D1-213, D1-216, D1-219, D1-220, D1-229, D1-230, D1-231, D1-234, D1-236, D1-238, D1-239, D1-241, D1-243, D1-245, D1-246, D1-247, D1-248, D1-250, D1-251, D1-252, D1-253, D1-254, D1-255, D1-258, D1-259, D1-260, D1-262, D1-265, D1-267, D1-268, D1-272, D1-273, D1-276, D1-277, D1-278, D1-280, D1-281, D1-282, D1-284, D1-287, D1-288, D1-323, D1-324, D1-325, D1-326, D1-327, D1-329, D1-242, D3-007, D3-058, D3-056, D3-055, D3-054, D3-053, D3-052, D3-021, D3-019, D3-008, D1-242, D1-325, D1-326, D1-327, D1-329, D1-332, D1-333.1, D1-333.2, D1-334, D1-337, D1-338, D1-338.2, D1-, D1-, D1-, D1-, D1-, D1-, D1-349, D1-350, D1-352, D1,
Extraordinary	
Unknown	D1-223, PD0009, D1-269, D1-271, D1-274, D1-275, D1-279, D1-283, D1-286,

V Bratislave dna: \_\_\_\_\_

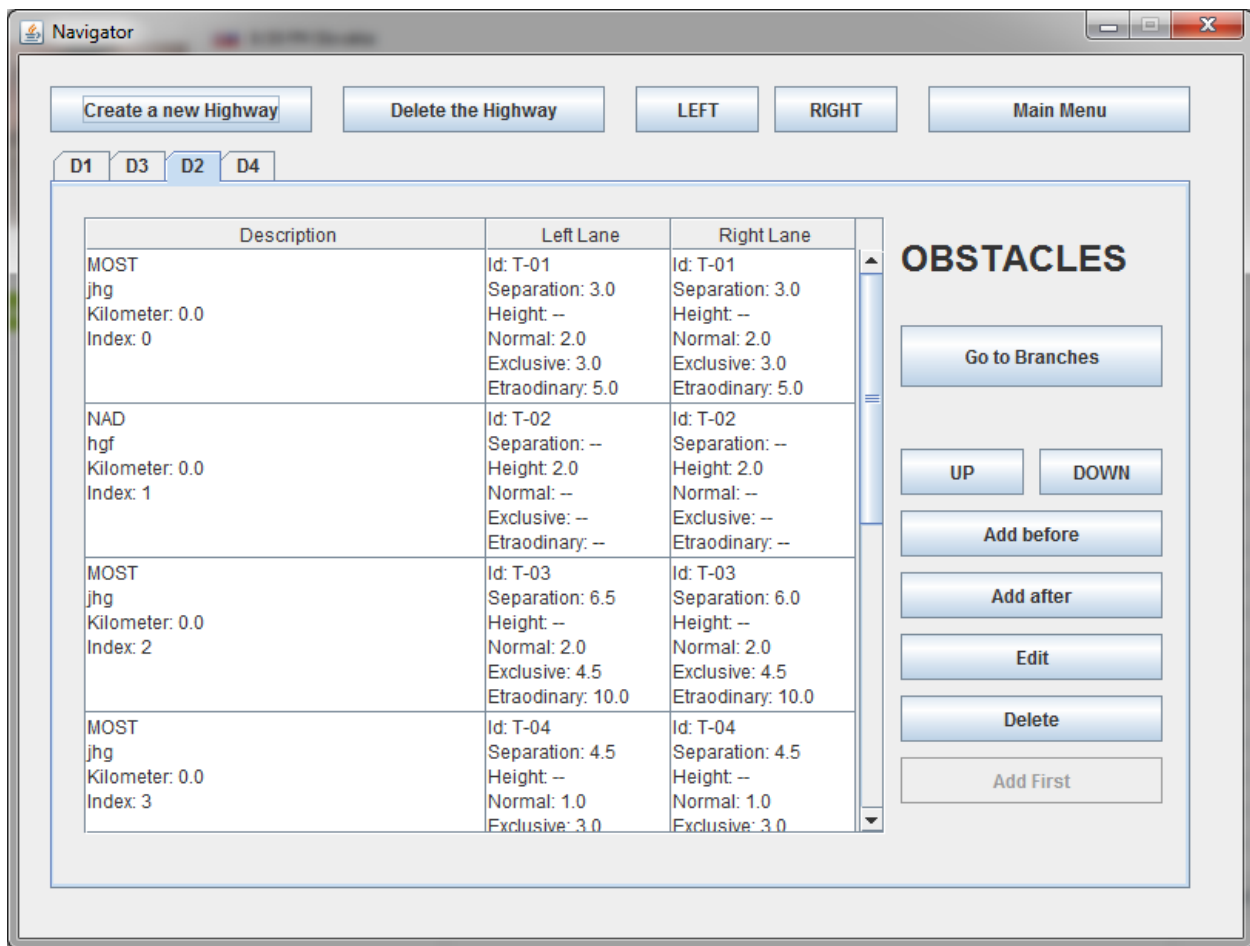
Vystavil: \_\_\_\_\_

1

**Figure - Sample exported PDF file**

## Editing obstacles, branches and highways

When the user goes from the main menu to the Editing section, the following screen is displayed. The Editor:



**Figure - Editor screen**

Here the user can edit the entire highway system. First I will discuss the editing of entire highways. The highways are displayed in tabs and can be created, deleted and moved around. If the user clicks the “Create highway button”, toe program prompts the user for a name for the new highway:



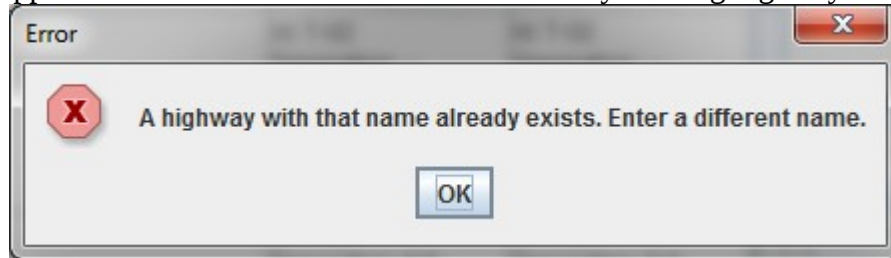
**Figure - Creating a Highway**

Four different error messages can come up at this point, the first three of which ask the user to enter a different name. The first one happens when the user presses “OK”, without entering a name (or enters only spaces):



**Figure - User did not provide a Highway name error message**

The second one appears if the user enters the name of an already existing highway:



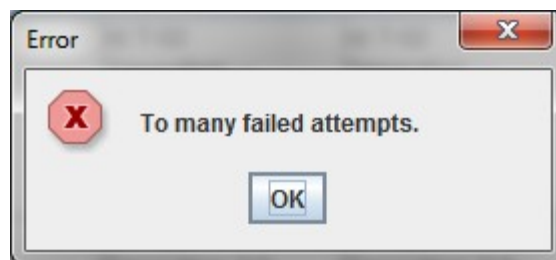
**Figure - A Highway with the provided name already exists error message**

The third one (less likely) appears when the user inputs text that cannot be placed into the name of a file.



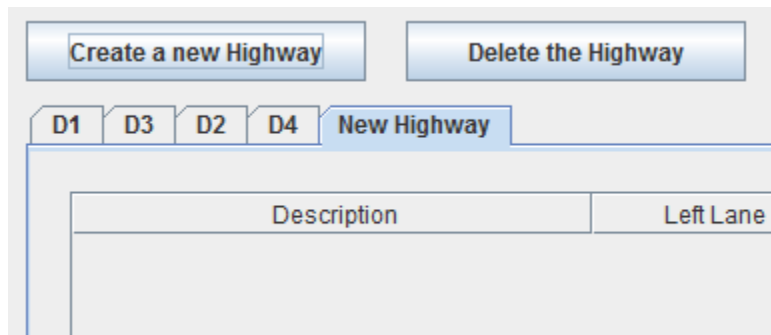
**Figure - The provided Highway name contained invalid characters**

The last error appears if the user makes too many incorrect attempts to create the highway (20 attempts). The program does not prompt the user for a different name, simply stops asking and lets the user out:



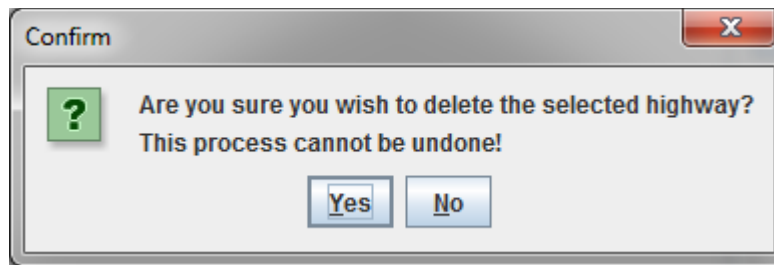
**Figure - User made too many failed attempts to create a Highway**

If the user manages to get the new name right, the program creates the new highway and selects it in the tabs:



**Figure - A newly created Highway**

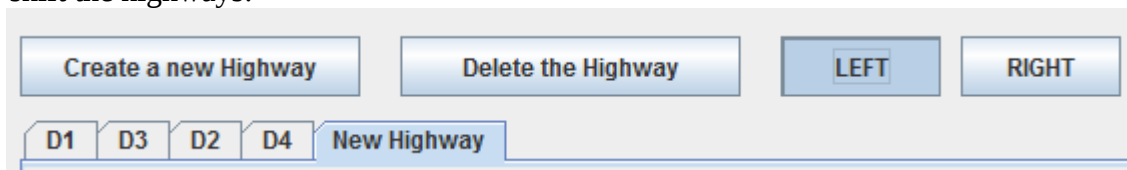
If the user chooses to delete a highway, one error can occur. If no highway is selected (there are no highways) the program does nothing. If there is a selected highway, the program will prompt the user to confirm the deletion:



**Figure - Highway deletion confirmation dialog**

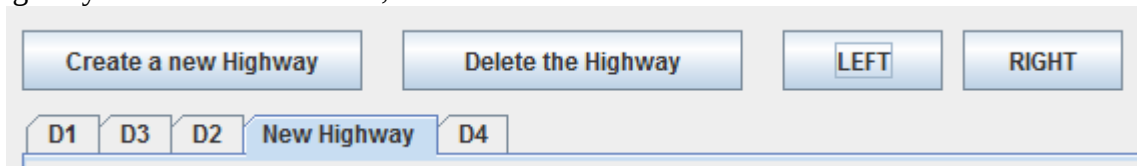
If the user selects "Yes", the highway will be deleted. If the user selects "No", the highway will not be deleted.

When the user wishes to reorganize the highways, he can use the "LEFT" and "RIGHT" buttons. These buttons shift the highways:



**Figure - Moving a Highway**

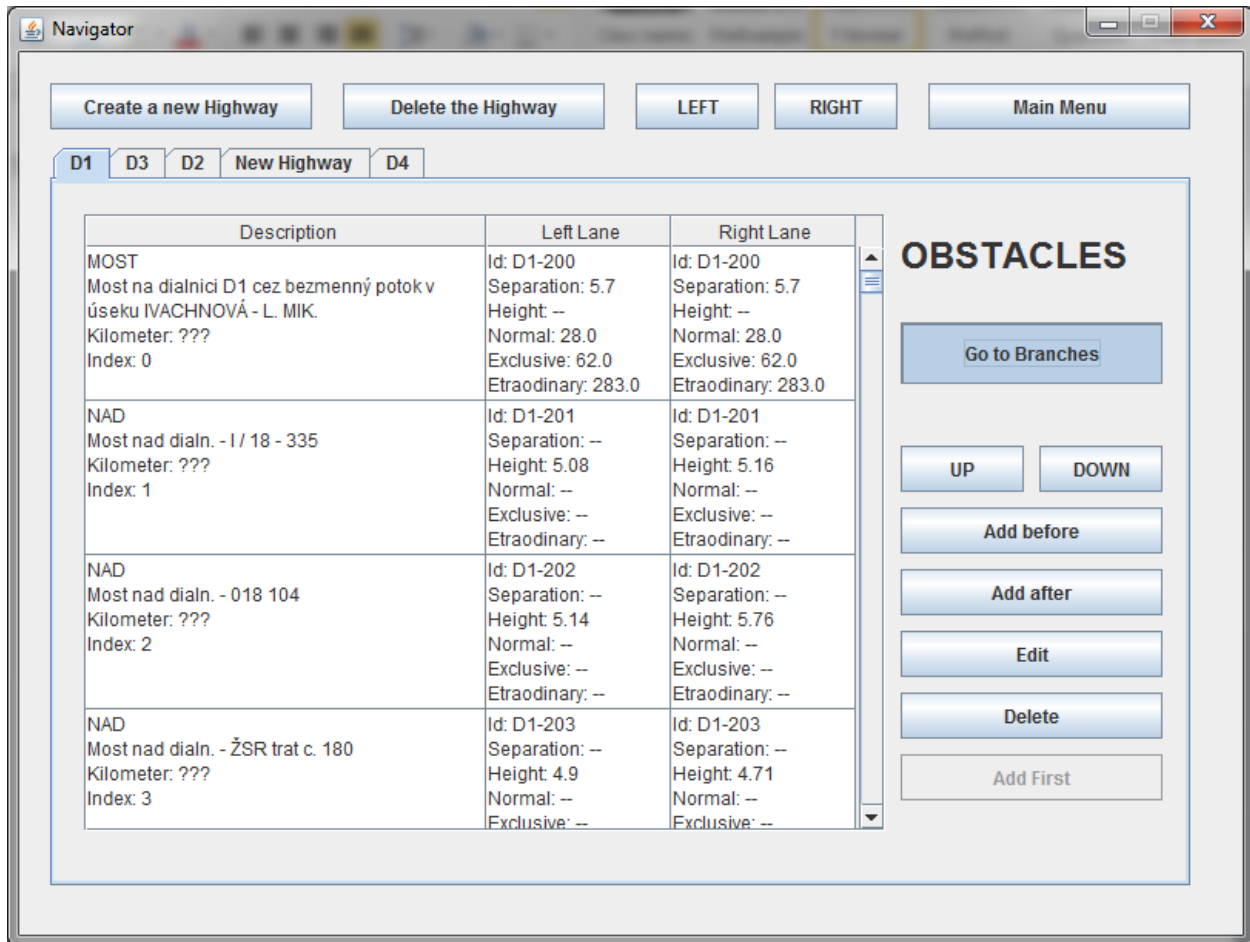
New Highway was moved to the left, after the button was clicked:



**Figure - Moved Highway**

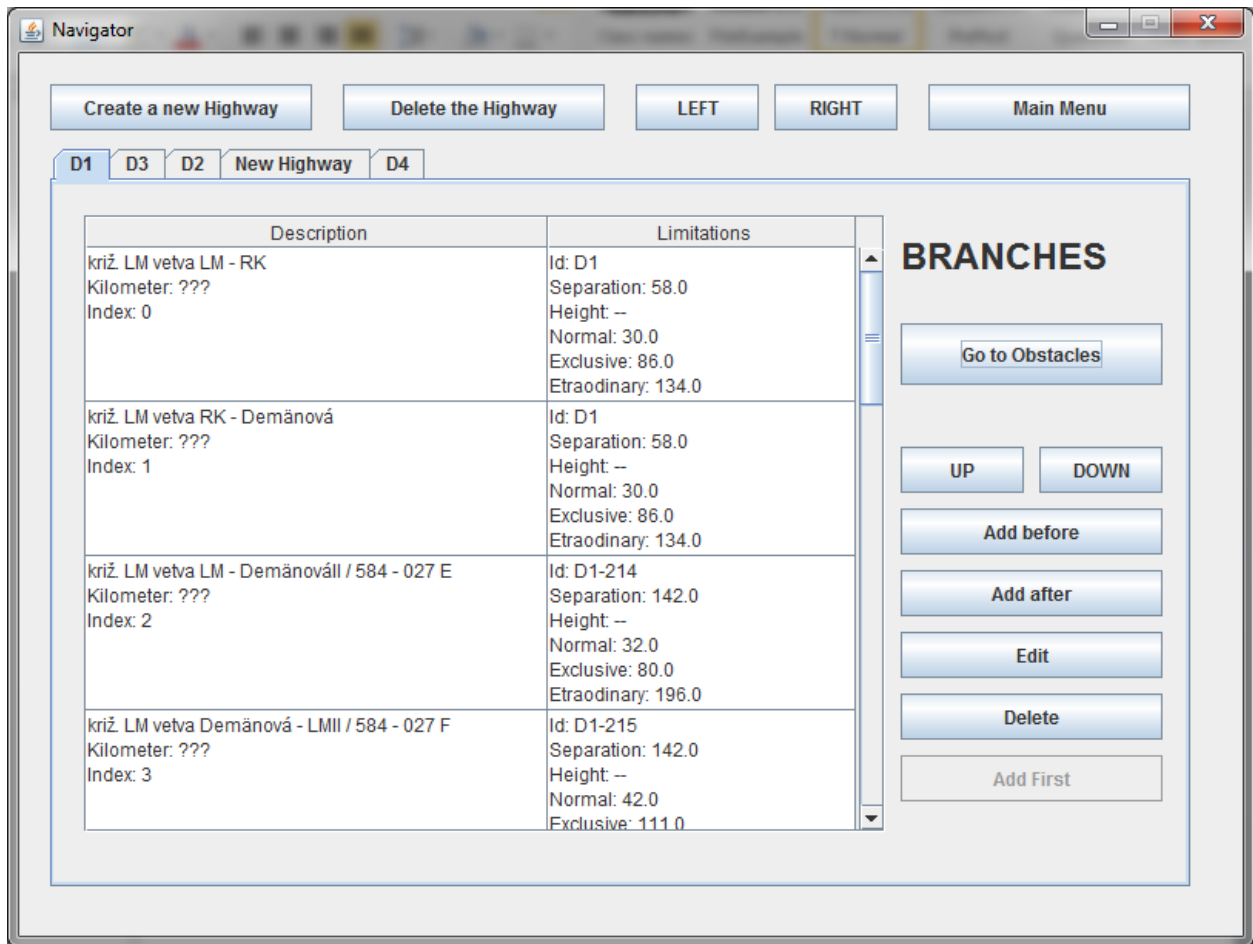
If the highway cannot be moved (it is already on the very left or on the very right), the program does nothing.

When it comes to the editing of Branches and Obstacles, there is a table in the tab, which displays either all the Obstacles in the same order as in which they are on the highway, or the Branches in the same order as in which they are on the highway. The user can switch views between them by the button shown below:



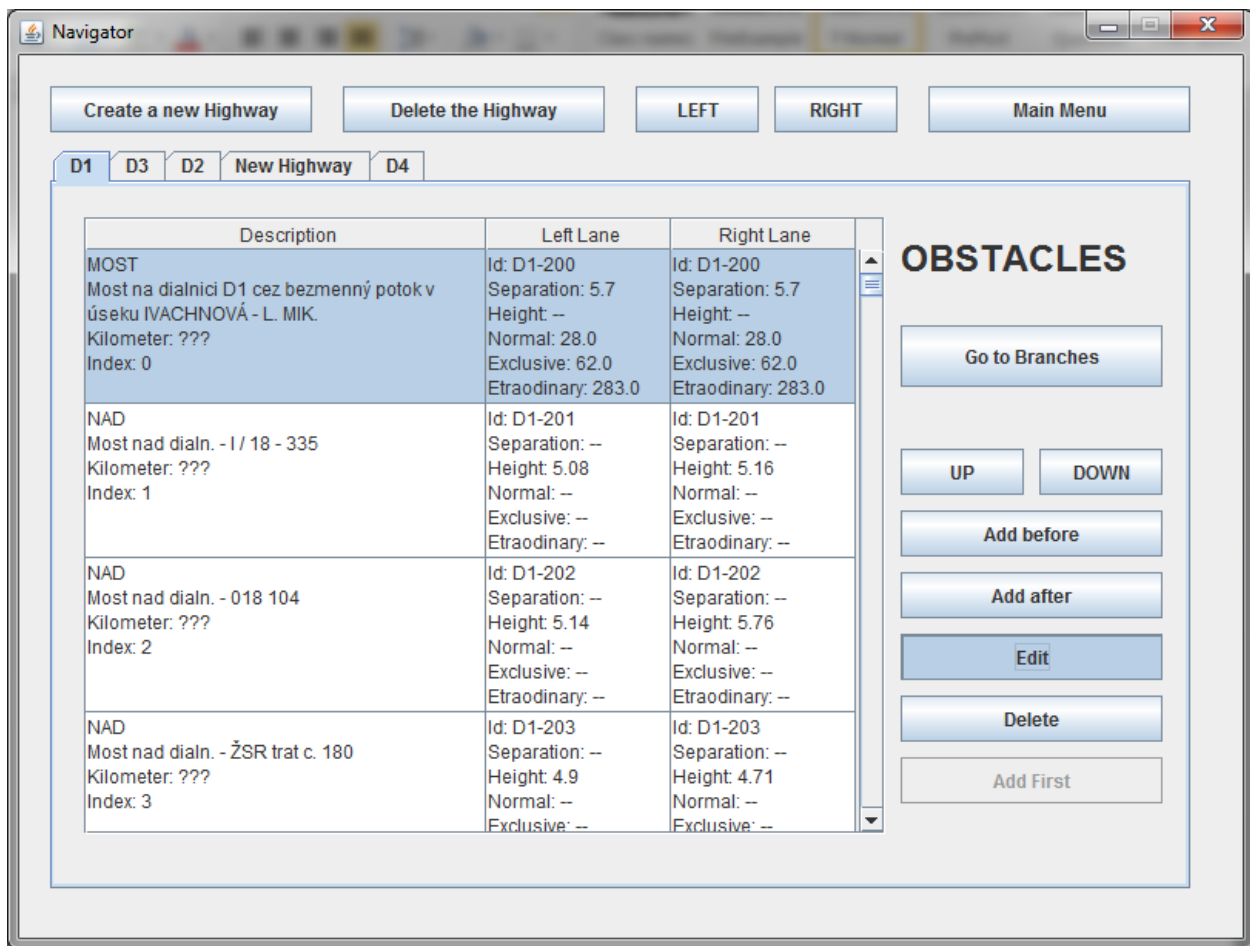
**Figure - Switching between Obstacles and Branches views**

After the switching button was pressed:



**Figure - Branches view**

The user can select an obstacle or branch and press the “Edit” button, to load the information about it into the Prompt window, where the user can edit it.



**Figure - Editing an Obstacle**

The selected obstacle opened in the Prompt window:

**Prompt**

Description: Most na dialnici D1 cez bezmenný potok v úseku IVACHNOVÁ - L. MIK.

Kilometer: ???

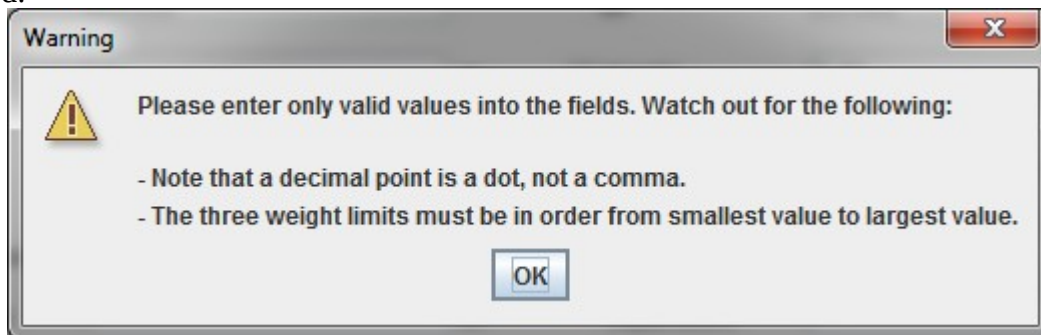
Left		Right	
ID:	D1-200	ID:	D1-200
<input type="checkbox"/> Height:	- m	<input type="checkbox"/> Height:	- m
<input checked="" type="checkbox"/> Normal:	28.0 t	<input checked="" type="checkbox"/> Normal:	28.0 t
Exclusive:	62.0 t	Exclusive:	62.0 t
Extraordinary:	283.0 t	Extraordinary:	283.0 t
Separation:	5.7 m	Separation:	5.7 m

WARNING! Invalid characters (";", "<" and ">") will be removed from the IDs and the description!

Cancel Save

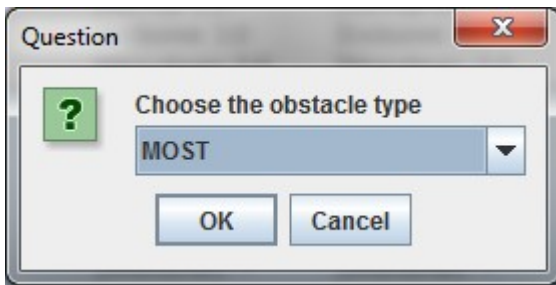
**Figure - Sample Obstacle loaded into the Prompt window**

If no obstacle or branch was selected when the user clicked “Edit”, nothing happens. The user can then edit the information about the opened obstacle or branch and save it. If there is a problem with the validity of the provided information, the changes are not saved, yet an error message is displayed:



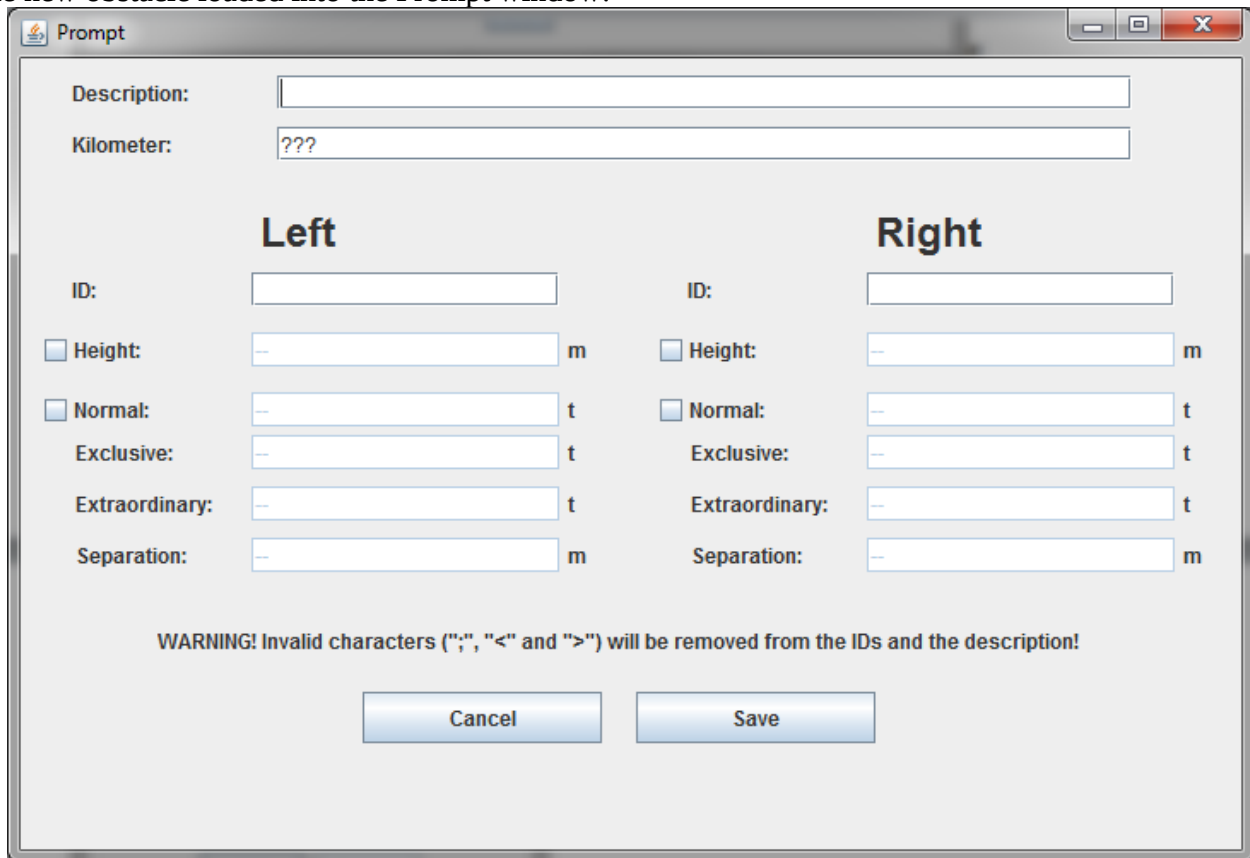
**Figure - Invalid user input error message**

If the user clicks the “Add after” or the “Add before” buttons, a new obstacle or branch (depending on the screen) will be loaded into the Prompt window:  
 If the user loads a new Branch, the branch will be loaded immediately. If the user adds an obstacle, the program will first ask, what type of obstacle is being added. A “MOST” (bridge) or a “NAD” (bridge above the highway).



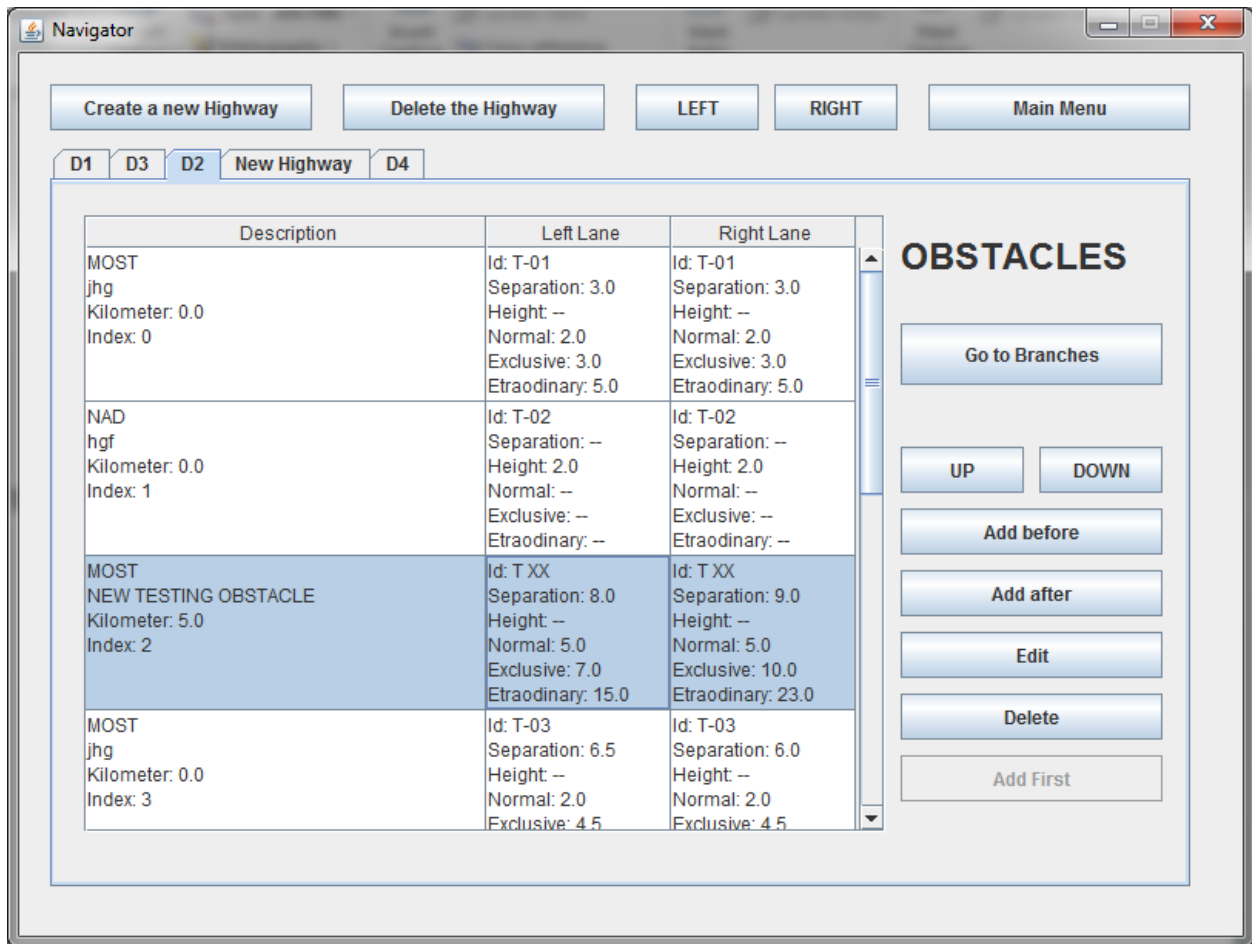
**Figure - Choosing between a "MOST" and "NAD"**

The new obstacle loaded into the Prompt window:



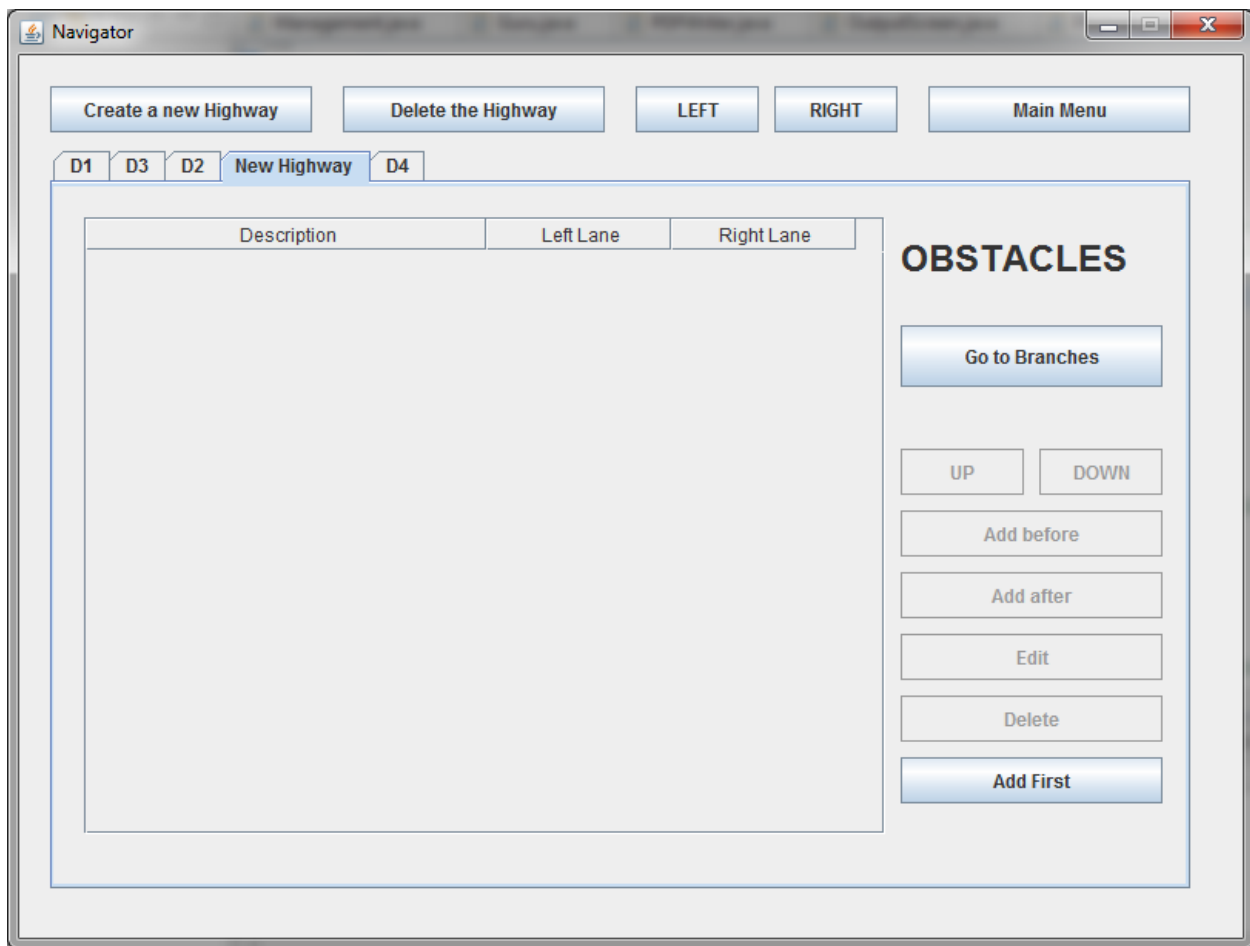
**Figure - Empty Prompt window**

Once the user is done editing the obstacle, "Save" can be pressed and the obstacle will be added to the table of highways. (If the user presses cancel, nothing will be saved). The new Obstacle in the table:



**Figure - New Obstacle added to the highway**

If there are no obstacles on the highway, the program disables the respective buttons and enables the "Add First" button. The buttons for such an empty highway look like this:



**Figure - Button arrangement for an empty Highway**

Moving obstacles and branches up and down in the order can be done by the “UP” and “DOWN” buttons. For user-friendliness, the obstacle or branch that was moved will remain selected for further movement (once moved, the user does not have to reselect the obstacle to move it again). Moving an obstacle:

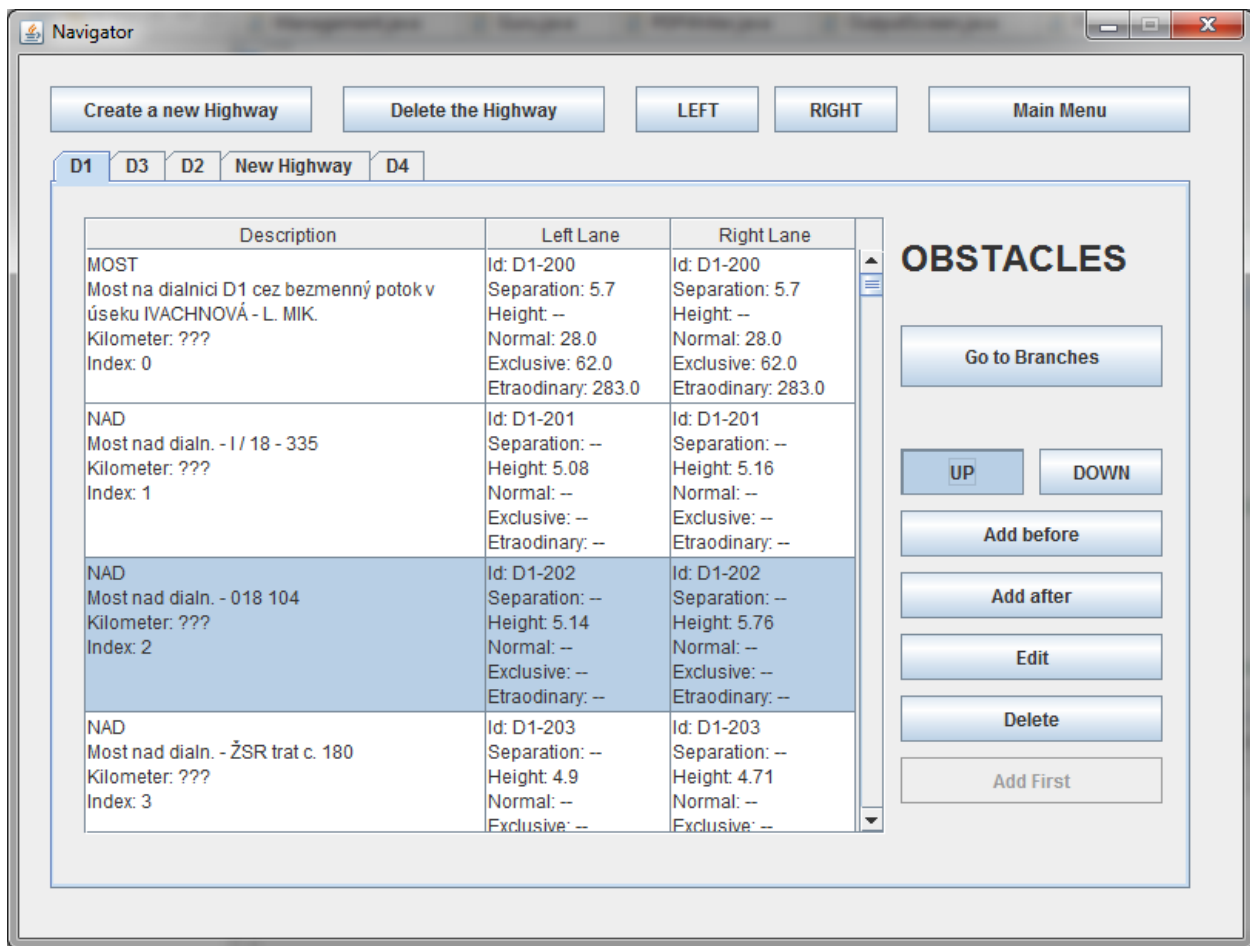
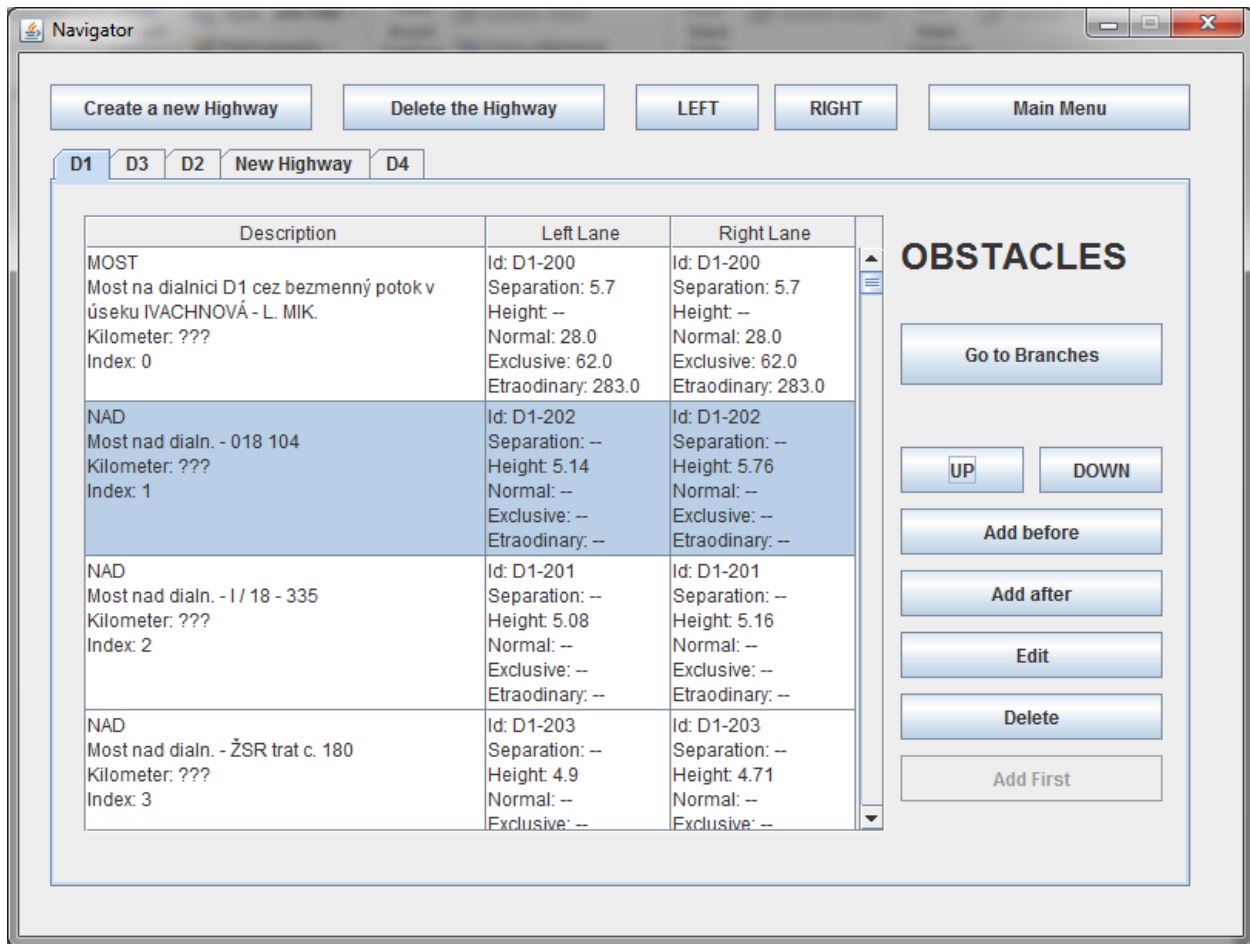


Figure - Moving an Obstacle

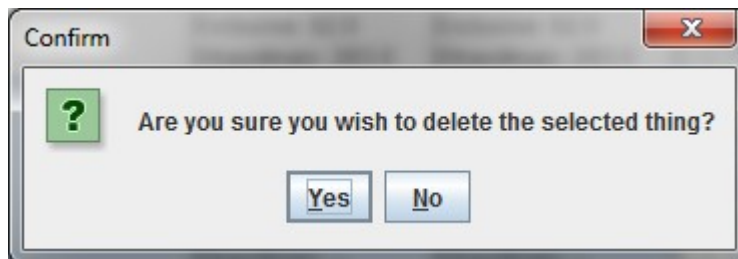
Result:



**Figure - Moved Obstacle**

If the selected obstacle or branch cannot be moved (it is already on the very top or on the very bottom), the program does nothing.

Deletion of an obstacle or branch is simple enough. The user can select an obstacle and click the "Delete" button to erase it. The window will prompt the user to confirm the deletion via the following dialog:



**Figure - Obstacle deletion confirmation dialog**

If the user presses "No", the program does nothing. If the user presses "Yes", the program deletes the obstacle:

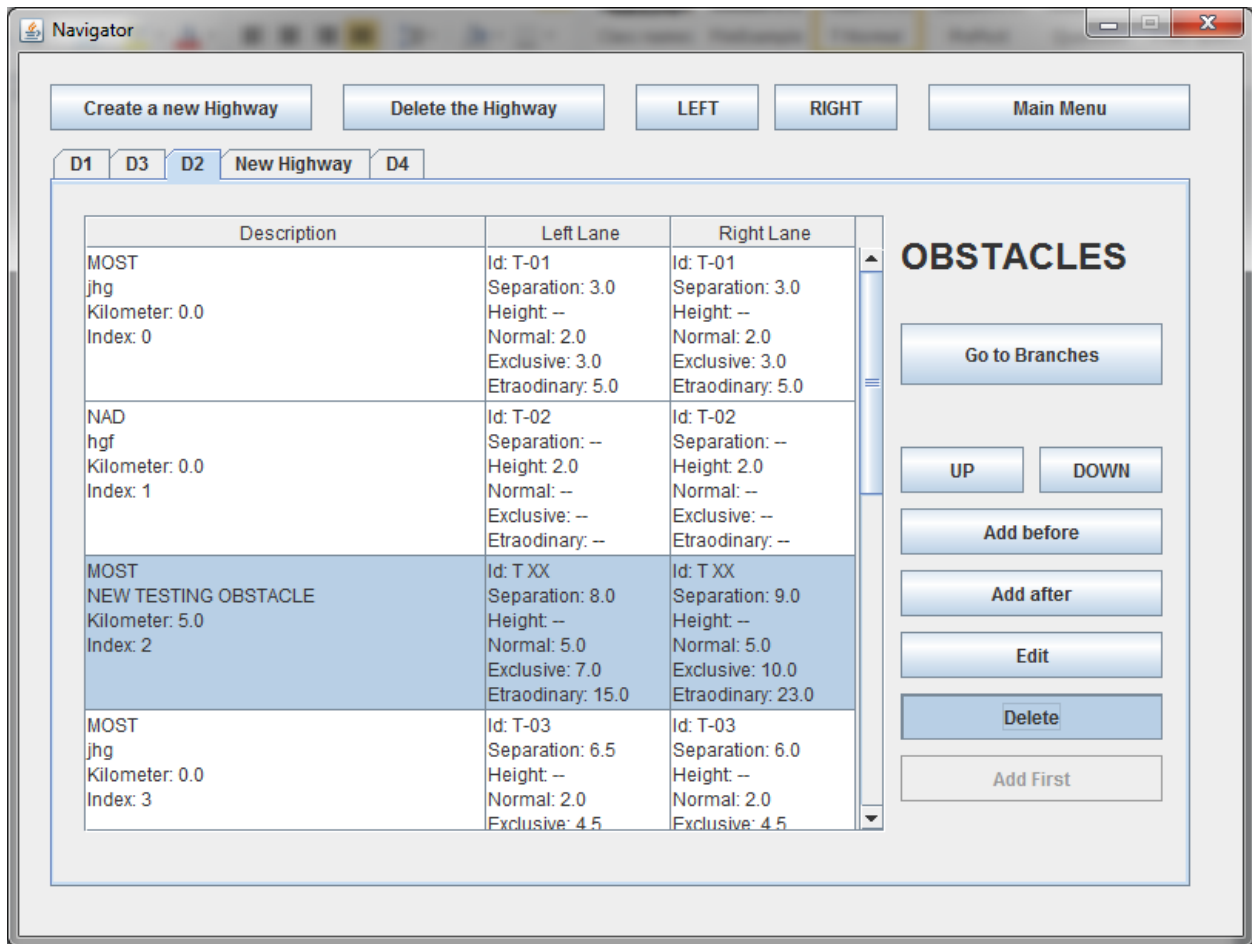
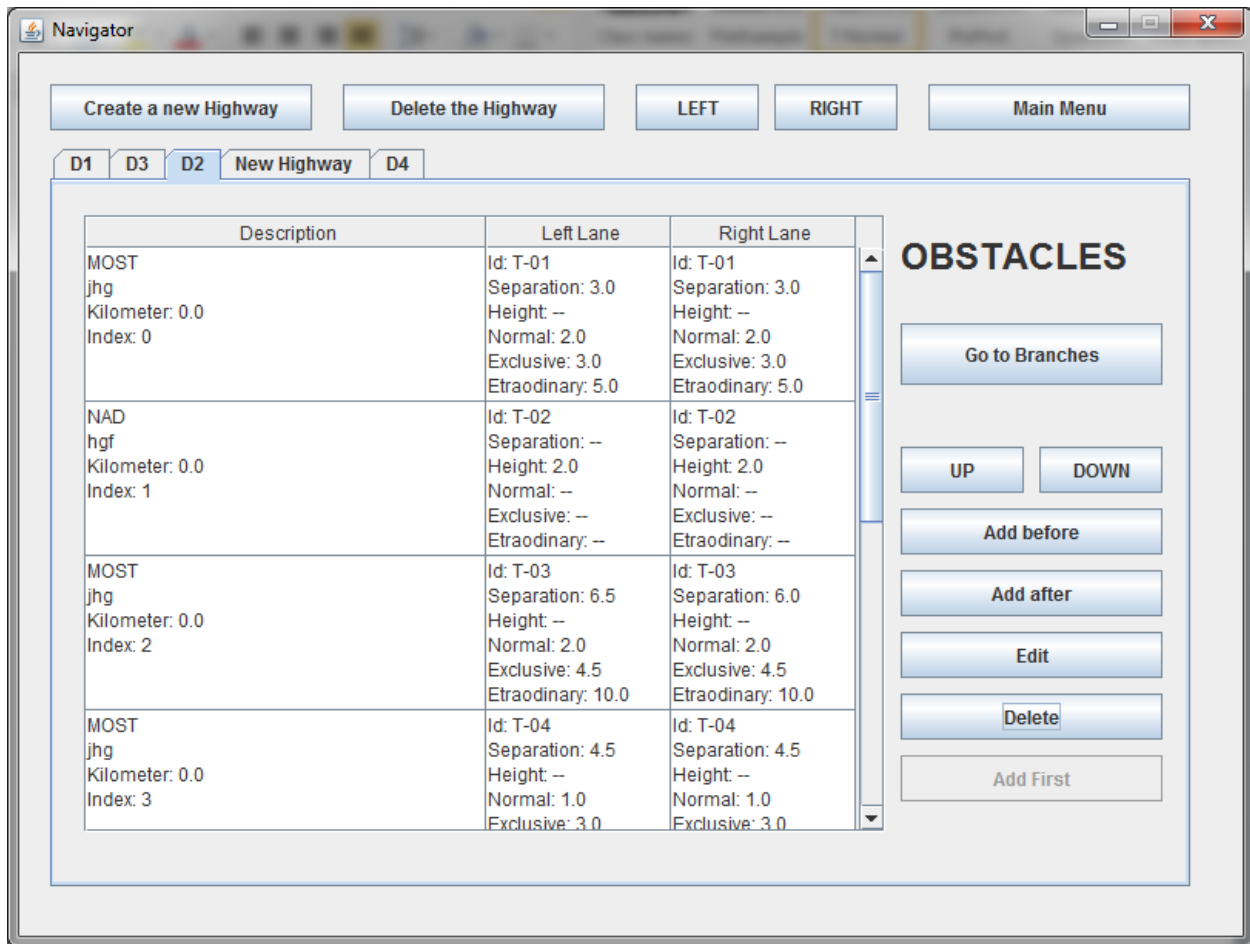


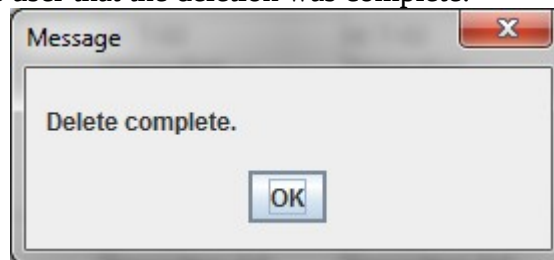
Figure - Deleting an Obstacle

Result:



**Figure - Deleted Obstacle**

The program also informs the user that the deletion was complete:



**Figure - Deletion completion message**

All these operations work in the same way for the branches as they do for the obstacles, except that when the program loads a branch into the Prompt window, it only displays the one side of the road (branches only have one side)

The image shows a software window titled "Prompt". At the top, there are standard window controls (minimize, maximize, close). Below the title bar, there are two input fields: "Description:" with the text "křiž LM vetva RK - Demánová" and "Kilometer:" with "???".

In the center, there is a section titled "Branch" with several input fields and checkboxes:

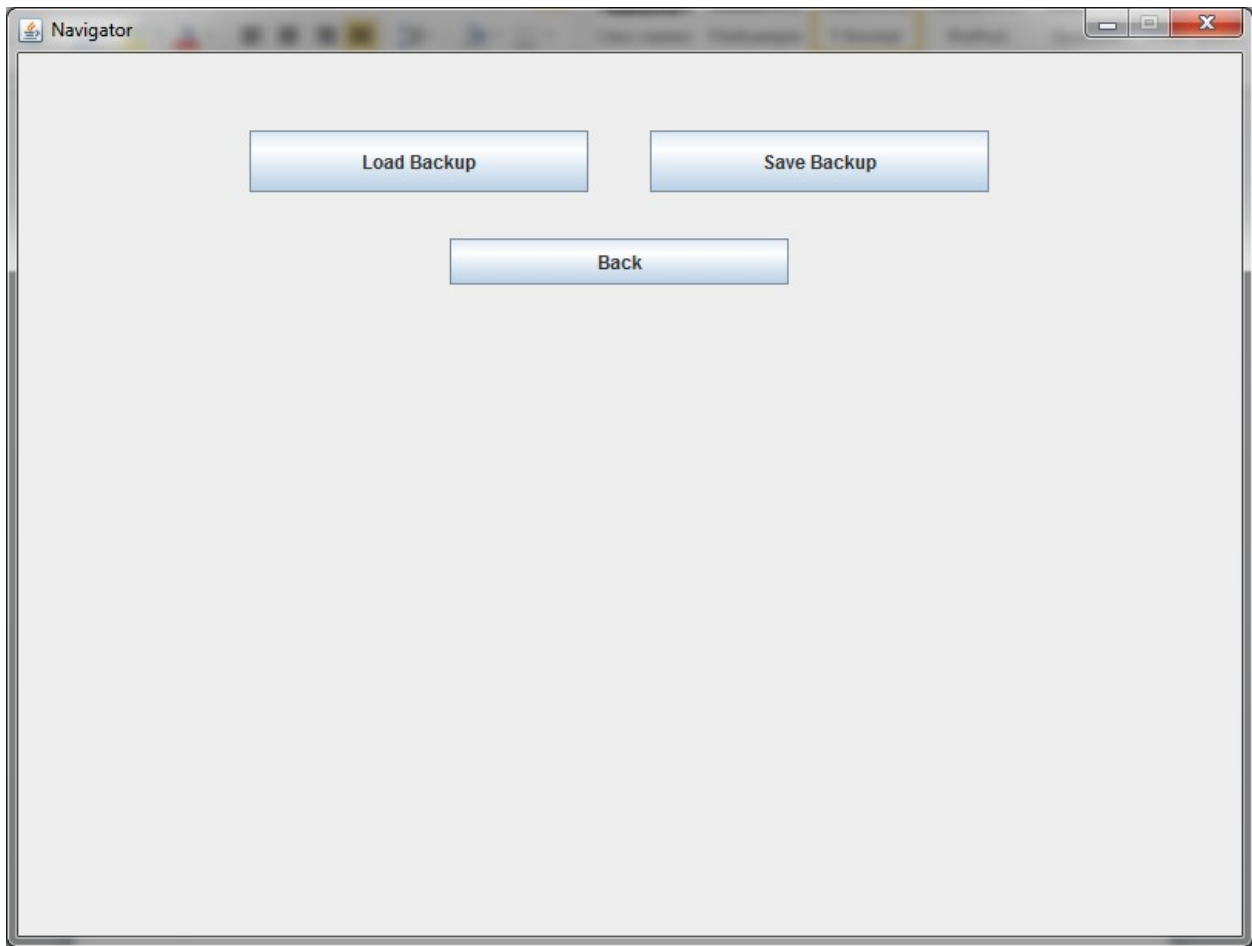
- ID: D1
- Height: -- m
- Normal: 30.0 t
- Exclusive: 86.0 t
- Extraordinary: 134.0 t
- Separation: 58.0 m

Below these fields, there is a warning message: "WARNING! Invalid characters (";", "<" and ">") will be removed from the IDs and the description!". At the bottom, there are two buttons: "Cancel" and "Save".

**Figure - Branch loaded into the Prompt window**

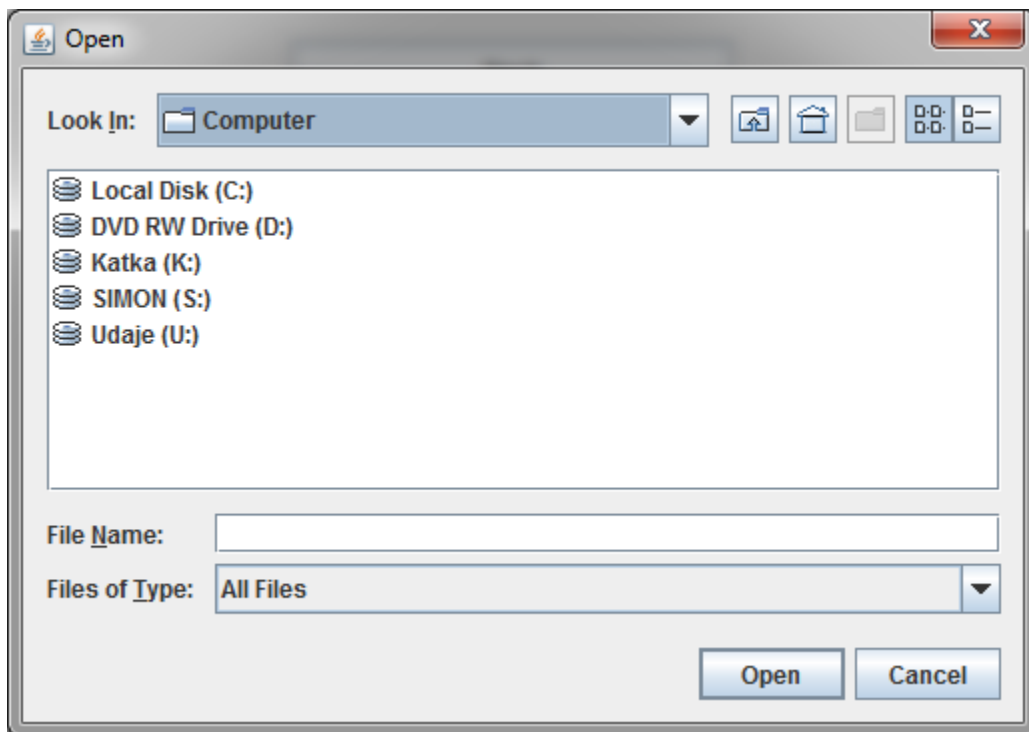
## Management – Saving and loading backups

When the user decides to load or save a backup, the backup management screen is displayed:



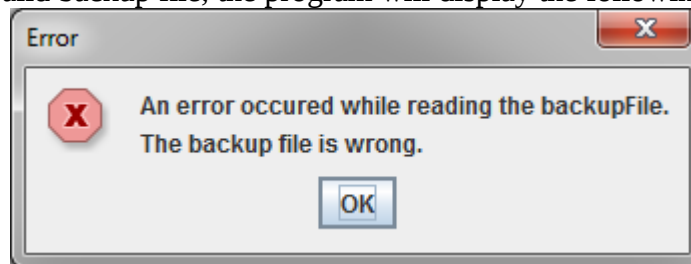
**Figure - Management screen**

Here the user can only perform two different actions. Load a backup, or save a backup. When the user clicks the “Load Backup” button, the program enables the user to select a file via the file browser dialog:



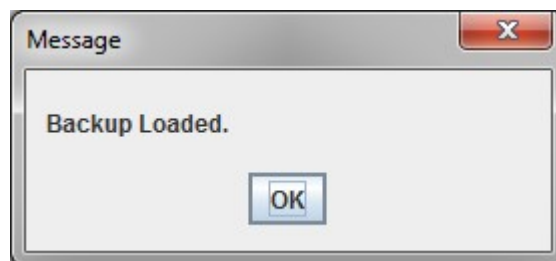
**Figure - Browsing window**

The user can then browse for the desired backup file and click “Open” to load it. If the user selects an invalid backup file, the program will display the following error dialog:



**Figure - Backup file loading error message**

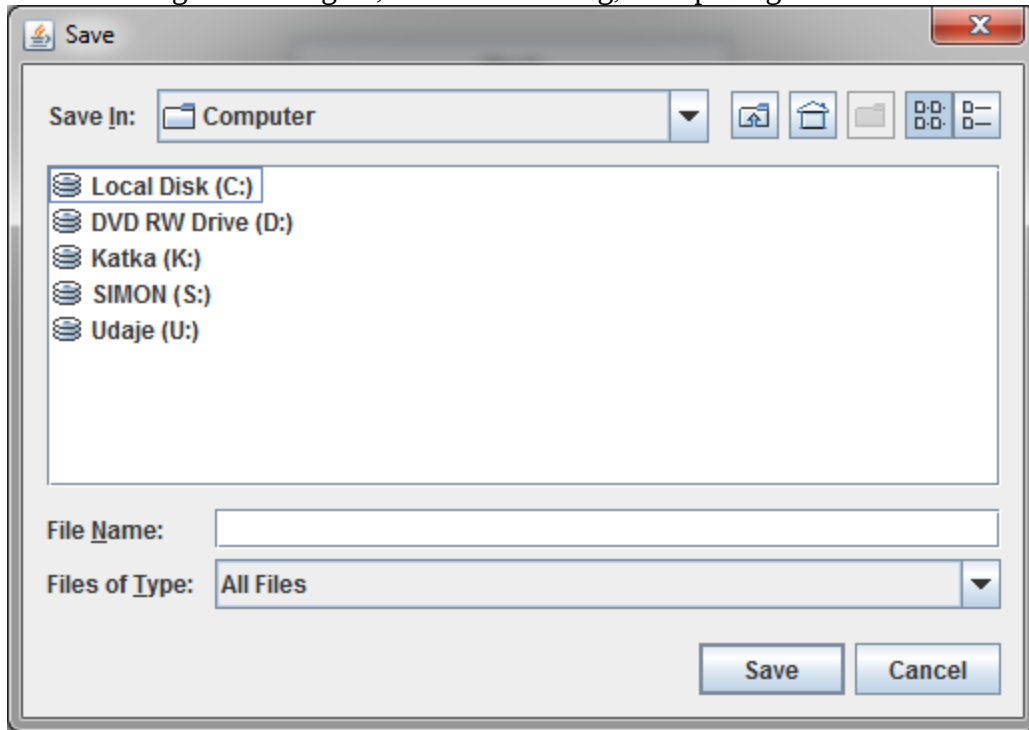
If the chosen backup file is successfully loaded, the program will inform the user of this via a message dialog:



**Figure - Successful backup loading message**

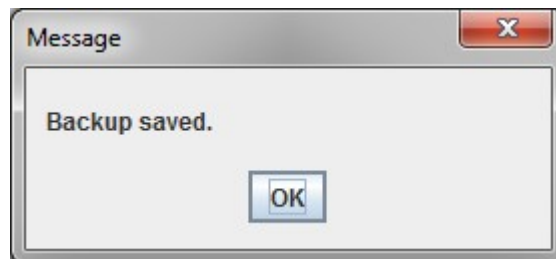
If the user wishes to save a backup file, the button “Save” must be clicked. In that case, the program

displays the file browsing window again, but set for saving, not opening.



**Figure - Saving window**

The user can then chose the directory for the backup and specify the name of the backup file. This file will be added the extension of “.BACKUP” and will be saved. The following dialog message indicates a successful saving.



**Figure - Successful backup save message**